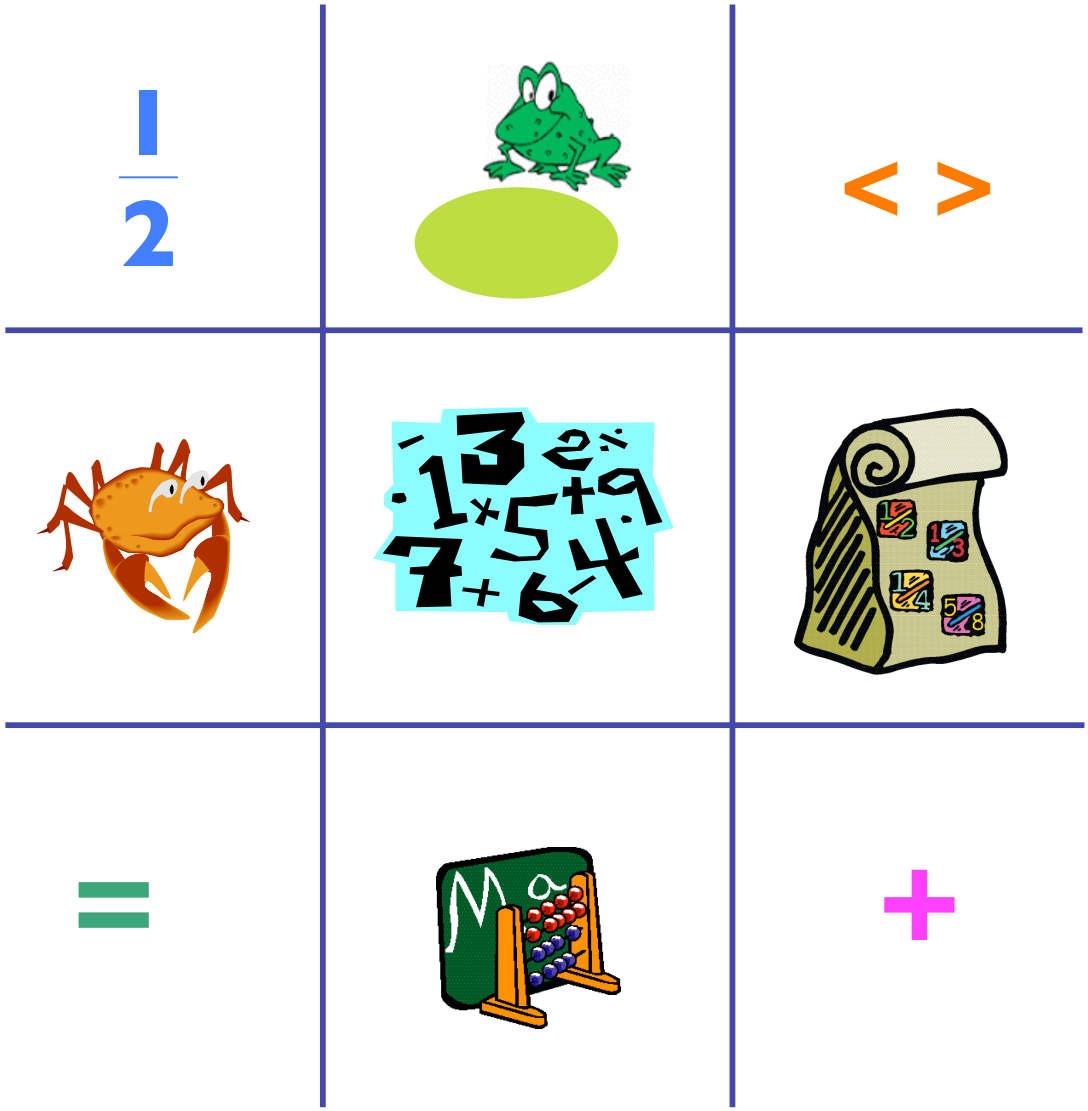
K-5 MATHEMATICS MODULE
Number and Number Sense



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Office of Elementary Instructional Services
Virginia Department of Education
P.O. Box 2120
Richmond, Virginia 23218-2120

Virginia Department of Education
P.O. Box 2120
Richmond, Virginia 23218-2120
www.doe.virginia.gov

Superintendent of Public Instruction
Dr. Billy K. Cannaday, Jr.

Chief Deputy Superintendent of Public Instruction
Dr. Patricia I. Wright

Assistant Superintendent of Instruction
Dr. Linda M. Wallinger

Office of Elementary Instructional Services
Dr. Mark R. Allan, Director
Dr. Deborah P. Wickham, Elementary Mathematics Specialist

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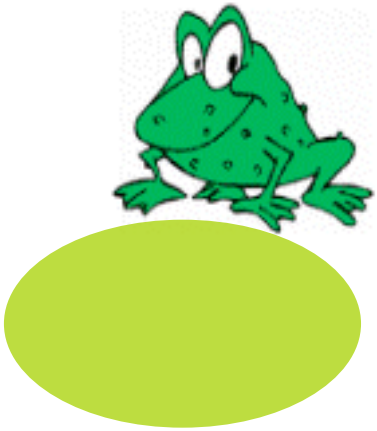
Introduction

The K-5 Mathematics Module: Number and Number Sense is designed to assist elementary school teachers in implementing the 2001 Virginia Standards of Learning for mathematics. This module provides a sample of meaningful and engaging activities correlated to the number and number sense strand of the kindergarten through grade five mathematics Standards of Learning. The purpose of the Number and Number Sense module is to enhance teachers' content knowledge and their use of instructional strategies for teaching the number and number sense strand.

Through explorations, problem-solving, reasoning, and hands-on experiences, teachers will engage students in activities that address many dimensions of number and number sense including counting, combining, sorting, comparing sets of objects, comparing whole numbers, rounding of numbers, and exploring place-value and fraction and decimal concepts to develop number understanding.

By using these activities, it is anticipated that teachers will develop new instructional techniques to assist them in increasing student mathematics achievement in the classroom.

KINDERGARTEN
Number and Number Sense



Number Boards

Format: Whole class, partners

SOL Objectives:

K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.7, K.14

Vocabulary: Varies depending on clues given

Materials: One number board; two sets of digit cards for each pair or group

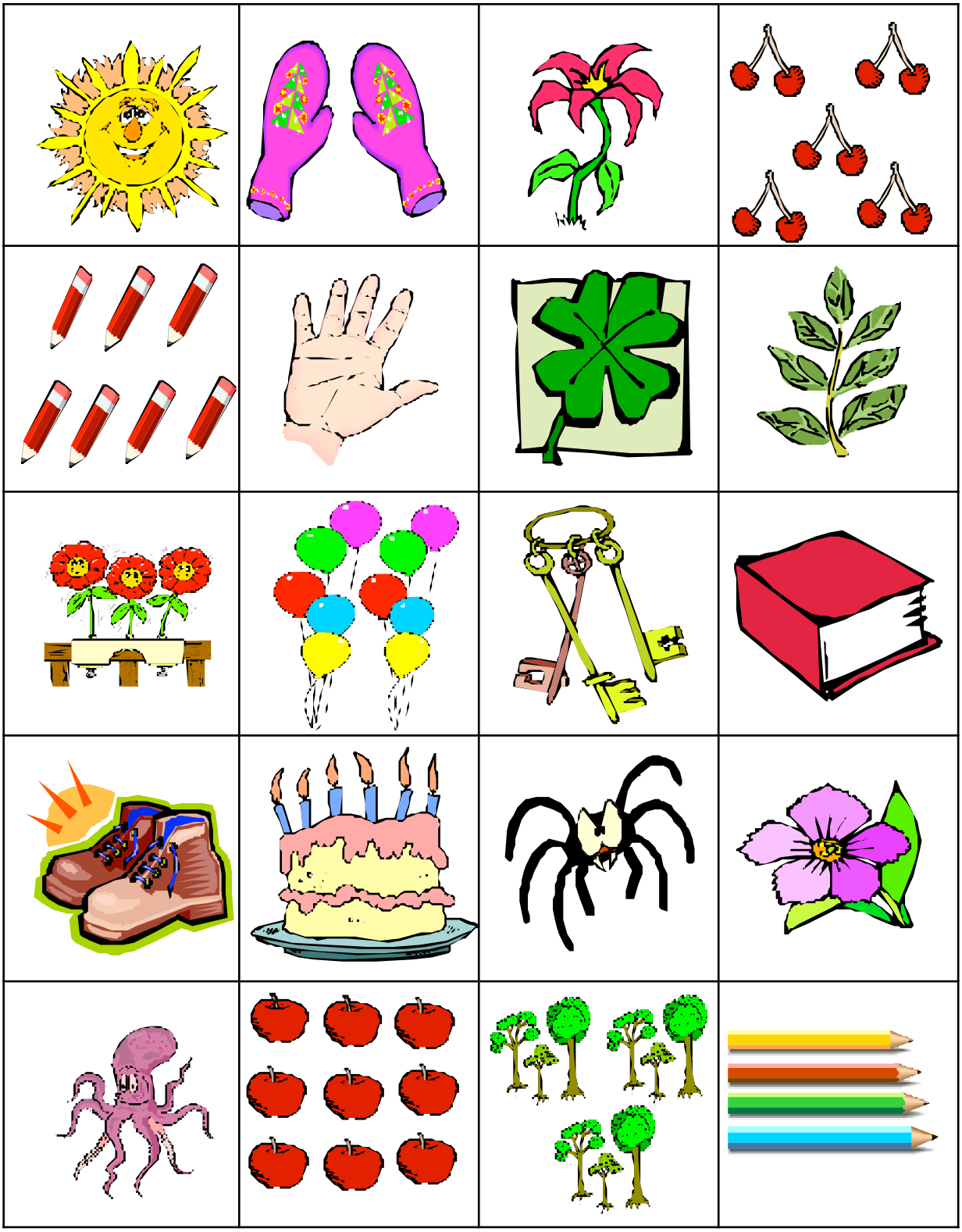
Time Required: 10 minutes

Directions

1. Direct students to work with a partner to cover the spaces on a number board, based on clues given by the teacher. Each number board has two representations for the numbers from 1 to 10. After providing a clue, have each student choose the appropriate number card and cover a corresponding space on the number board.
2. Representations for the numbers on the number boards may vary so as to give students experience with thinking about the numbers in a variety of forms. You may create different number boards as needed.
3. Clues for the numbers will vary depending on the students' needs and your goals. One number can be left uncovered for a quick check of accuracy at the end of the activity. "Which number is not covered on your board?"
4. Examples of clues:
   • Cover the number that is one more than 4.
   • Cover the number of pennies equal to one nickel.
   • Cover the number that comes right before 6.
   • Cover the number of legs that a puppy has.

(Note: You should develop additional clues as appropriate. Clues may include a variety of concepts or concentrate on a specific skill.)

Number Board 1



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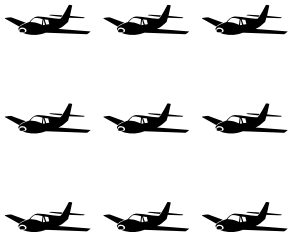
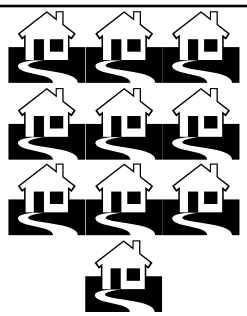
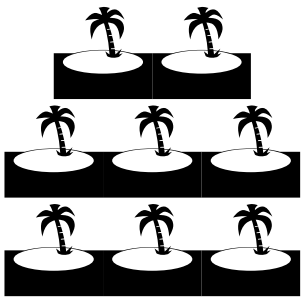
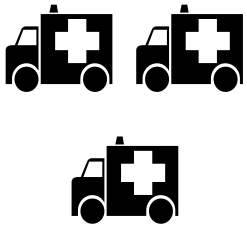
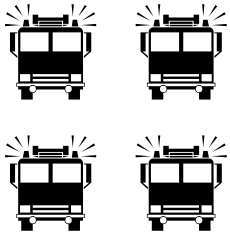
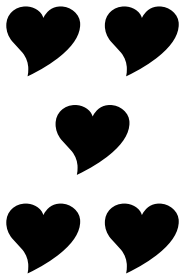
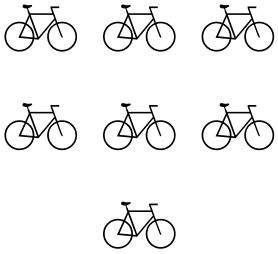
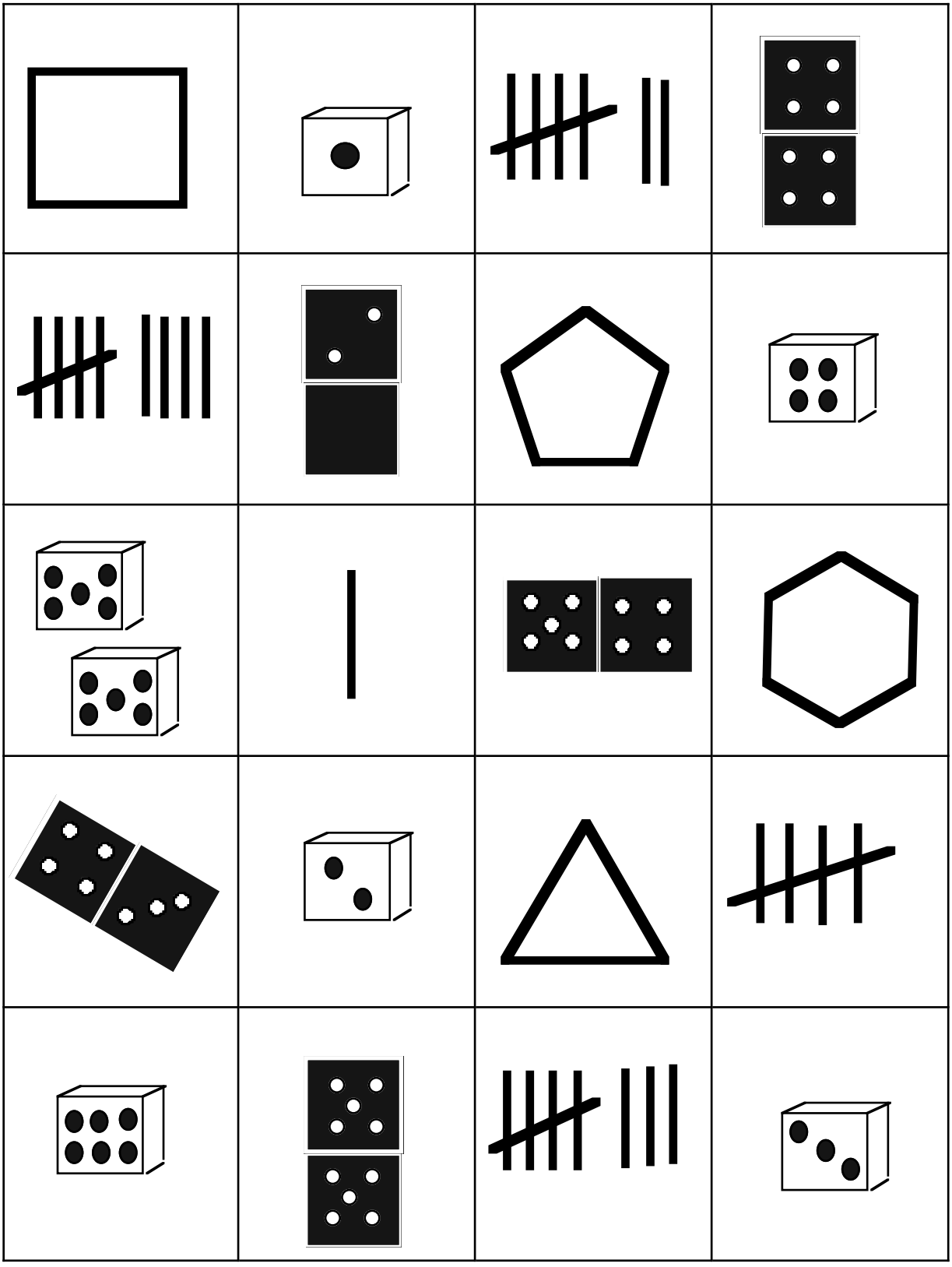
2			3
5			8
	9	1	
	6		
4		10	7

Number Board 3



Digit Cards (copy and cut apart)

1	2	3	4
5	6	7	8
9	10		

Build and Compare

Format: Whole class, partners

SOL Objectives:

K.1 The student, given two sets containing 10 or fewer concrete items, identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.

Related SOL: K.2, K.5, 1.1

Vocabulary: *Number words*, *more*, *less*, *same*, *bigger*, *smaller*, *equal*

Materials: Deck of cards (with face cards removed); linking cubes

Time Required: 10 minutes, whole class; 15 to 20 minutes in partners

Directions:

1. Share number cards 1 to 10 with students. Ask them to tell something about each number shown. Using 10 as an example, students might count the number of fingers they have, share that $10 is a lot of money, or point out that 10 is a number bigger than six. Try a few different numbers to get students talking and sharing what they know about each number.
2. Have two students hold up different number cards and compare their numbers. Ask, "Which is more/less? How do you know?"
3. Teach students the game of "Build and Compare." Shuffle a deck of cards (face cards removed) and deal the cards evenly between the two players (facedown in two piles). Players say in unison, "1, 2, 3, compare," as each turns over the top card.
4. Each player states his or her number. "I have a _____" and "I have a ___." Then the players call out, "Build it!" and use linking cubes to build a tower to represent their numbers. After the towers are built, the two players compare their towers and their numbers using *more*, *less*, and *same* vocabulary. For example, "Six is more than four" and "Four is less than six." The two number cards are then put into the used pile and another set is drawn. The game ends when all the cards have been compared. Shuffle and play again!

Exploration Questions:

- Tell me a number that is bigger than___.
- Which is bigger? How do you know?
- What do you notice about the two towers?

Variations:

- Play with number cards or 10-frame cards instead of regular playing cards.
- Play with numbers 1 to 5 only.
- Play with numbers 11 to 20.

Garbage!

Format: Whole class, partners

SOL Objectives:
K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.5, 1.3, 1.4

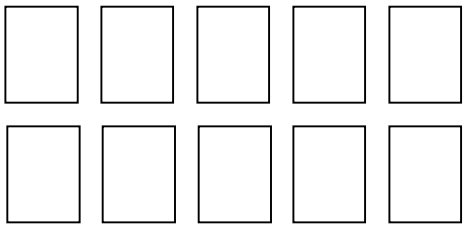
Vocabulary: *more than*, *less than*, *greater than*, *before*, *after*, *counting on*, *counting back*

Materials: Large deck of cards for display; regular decks of cards with face cards removed (one deck per partner set, or small groups of three) or decks made from 10-frame cards (attached)

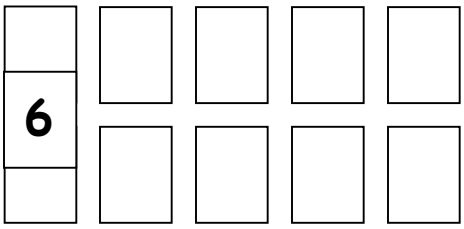
Time Required: 15 minutes, whole class; 15 to 20 minutes in partners

Directions:
1. Place cards 1 to 10 randomly on the floor. Have students share numbers they recognize and can name. Ask, "Are the cards in order?" Have students share ideas about the order of numbers 1 to 10.

2. Teach students the game "Garbage." Shuffle a deck of cards with the Jack, Queen, King, and Jokers removed. Deal 10 cards facedown to each player. Place extra cards in the draw pile. Players arrange their cards (facedown) in a 10-frame pattern as shown below.



3. The first player takes a card from the draw pile and looks at it. The player names the card and then places it in the proper place by counting. For example, "I have a 6 and it goes in the 1, 2, 3, 4, 5, 6 space." The 6 is placed face up and the card underneath is revealed.



4. The card revealed under the 6 is then named, and the player tries to explain where it goes in relation to the first card (i.e., the 6). For example, if the uncovered card is a 10, the student might

say, "10 is more than 6," and count on from 6 to get to 10. Or, the player may have to start back at 1 to count all the way to the 10's space. Once the appropriate space is determined, that card is placed faceup and the card beneath it is revealed. With each play, the student tries to articulate how the two numbers relate to one another in order to place the new card.

5. Play continues until a card is revealed that has already been played. If the player uncovers a card that has already been placed (faceup), he or she calls, "Garbage!" and puts that card into a pile next to the draw pile.

6. Player Two begins the same way, by drawing from the draw pile. Or, the player may use the top card in the "garbage" pile to start play.

7. Each time "Garbage!" is called, play transfers to the next player. The object of the game is for the players to reveal and order their cards from 1 to 10. The game is over when the first player achieves that objective.

8. You should observe and listen for students to use *counting on*, *counting back*, *before,* and *after*, as well as other strategies to describe the placement of each number.

Exploration Questions:

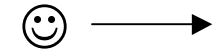
- How did you know where the ___ went?
- Which numbers are you missing?
- Is there another way you know that the number goes in that space?
- What do you know about these two numbers: ___ and ___?
- Can you tell me where ___ goes? Is it before or after ___? How do you know?

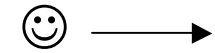
Variations:

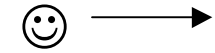
- Use 10-frame cards (attached) instead of regular playing cards. You will need three sets of 1 to 10 for each partnership.
- Play with numbers 1 to 5, slowly adding numbers to the game as the first five are mastered.
- Play with teen numbers (up to 20), ordinal numbers, fractions, and/or decimal numbers.

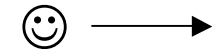
10-Frame Cards

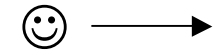
(copy and cut out three sets per pair)

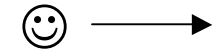


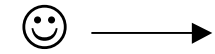


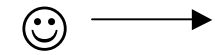


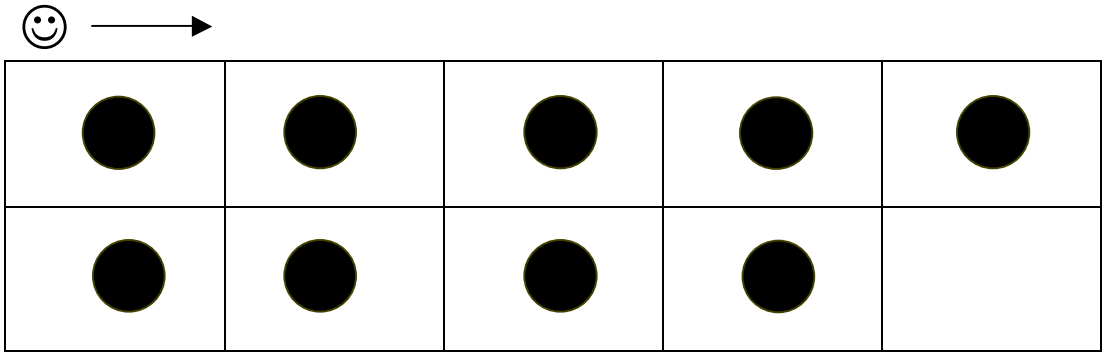


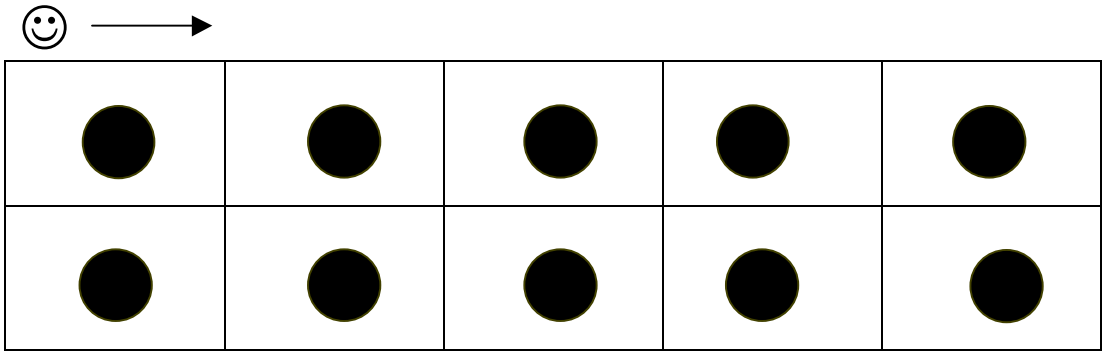












How Many?

Format: Whole class

SOL Objectives:
K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.5, K.6, K.12, K.17, 1.8

Vocabulary: *count*, *total*, *more*

Materials: Overhead projector; magnetic counters; magnet wand; Bingo supplies

Time Required: 20 minutes

Directions:
This activity helps develop fluency with composing and decomposing numbers, meaning that a whole number can be broken down into multiple addends. Decomposition of numbers is necessary to support a rich place value concept and a sound basis for mental computation.

1. Place 6 to 10 counters randomly on the overhead projector. Have the students determine the total number of counters shown and describe their counting strategies.
2. Turn the projector off and use the magnet wand to pick up some of the counters. (Students should not see how many counters are on the wand.)
3. Turn on the projector. Have students identify the number of counters showing.
4. Ask students, "How many counters are on the wand? How do you know?"
5. Replace the counters from the wand and repeat, picking up a different number of counters with the magnet wand each time.

Exploration Questions:
- What is the missing part of (target number)? How do you know?
- Is there another way to make (target number)?
- Can you think of all the combinations to make (target number)?
- How can you be sure you have made all the combinations?

Variations:
- Larger numbers of counters can be used (up to 20).
- Counters can be arranged spatially (e.g., in rows of two or groups of three).
- Number sentences (symbols) can be introduced for recording purposes.

Lily Pad Hop!

Format: Whole class, small groups, partners

SOL Objectives:
K.5 The student will count forward to 30 and backward from 10.

Related SOL: K.2, 1.3

Vocabulary: *counting*, *number words*, *dots* or *pips*

Materials: Game board; number cube; markers/counters; green construction paper circles for lily pads; *Jump, Frog, Jump!,* by Robert Kalan

Time Required: 10 to 15 minutes

Directions:
1. Ask students to share some things they know about frogs. What do they do? Read students the book, *Jump Frog, Jump!* In the story, there are a variety of animals. The frog gets around by jumping or hopping.
2. Have students pretend they are frogs and hop. Ask, "How can we tell how far the frog has gone?" (Answer: "We can count his hops.") Have students call out a number and hop that many times, getting their whole bodies involved in counting.
3. Lay out the green circles as lily pads. Have students hop and count how many lily pads they land on. Each time a student frog lands, talk about counting hops. The other students can use their hands and hop on their legs to get the feel of hopping and counting together, practicing one-to-one correspondence.
4. Teach students to play "Lily Pad Hop." Each set of partners or small group needs a game board, a number cube, and markers/counters. For each turn, the player rolls the number cube, names the number rolled, and then moves one of the markers/counters across the board. The object is to get all of the frogs to the pond or lily pad. If a frog gets to the pond and the player still has hops remaining, the student can move another frog toward the pond. In other words, players can split their hops between two frogs if needed. The game is over when all of the frogs get to their ponds.

Exploration Questions:
- How many more spaces do you have to get to the lily pad, or to the end? How do you know?
- Are you halfway there? How do you know?
- Do hops and number names stay together?

Variations:
- Play with regular six-sided die with pips (small dots).
- Play continuously by letting the frogs start over each time they reach the pond.

Lily Pad Hop! Game Board

 10	 10	 10	 10
9	9	9	9
8	8	8	8
7	7	7	7
6	6	6	6
5	5	5	5
4	4	4	4
3	3	3	3
2	2	2	2
 1	 1	 1	 1

Quick Images

Format: Whole class

SOL Objectives:
K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.1, K.5, K.6, K.12, K.17, 1.3, 1.8

Vocabulary: *more*, *fewer*, *less*, *above*, *below*, *beside*, *group*, *set*

Materials: 10-frames, or dot cards

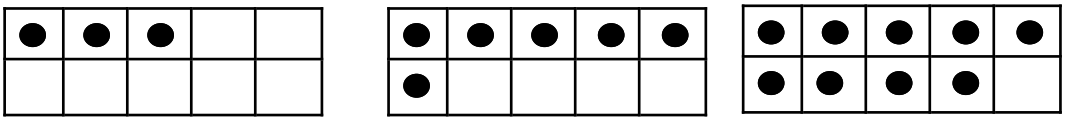
Time Required: 10 minutes

Directions:
1. Present the students with a dot card, or 10-frame, for approximately 5 seconds.
2. Ask students to report the total number of dots, and describe how they got that answer.
3. Encourage students to share different strategies. For example, when presented with a 10-frame that has eight dots, some students may see it as five and three more, while others may see two fewer than 10. An arrangement of five dots, such as those seen on a standard die, might be seen as two groups of two dots plus one more, or a group of three above another group of two.
4. Repeat this activity frequently with a variety of numbers and spatial arrangements.

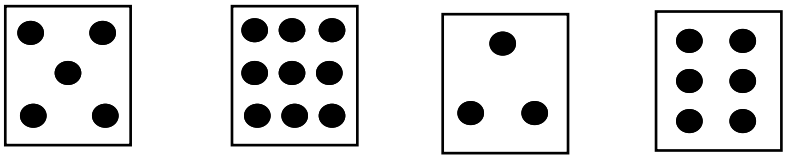
Note: Creating and using specially patterned arrangements to represent numbers encourages students to create mental images that are important for developing fluency in composing and decomposing numbers with automaticity. The 10-frame model is especially useful for developing ideas about the benchmark numbers of 5 and 10.

Variations:
- Dominoes, playing cards, and standard number cubes all have representations of common spatial arrangements for numbers. Multiple experiences with each of these help develop student understanding.
- *Math for All Seasons* and *The Grapes of Math*, both by Greg Tang, encourage the reader to use spatial arrangements to solve math riddles.

10-Frame Examples



Dot Card Examples



How Many Snails?

Format: Whole class

SOL Objectives:

K.1 Given two sets containing 10 or fewer concrete items, identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.

Related SOL: K.2, K.5, K.6, K.12, K.17, 1.3

Vocabulary: *more*, *less*, *same*, *how many*, *count*, attribute words (e.g., *color*, *design*, *size*)

Materials: *How Many Snails?,* by Paul Giganti and Donald Crews; art materials (paper, markers, crayons, or paint)

Time Required: 20 minutes

Directions:

1. Read *How Many Snails?* to the class. The book provides many opportunities for counting sets and subsets on every page. Encourage students to take turns counting and discussing their counting strategies as the book is read.
2. Ask students to compare one group to another group on the page: "Are there more, fewer, or the same number in the two groups?"
3. Given appropriate art supplies, have each student draw a picture of a balloon. Tell the students that they should try to make their balloon unique.
4. Make a display with all the balloon pictures. (This could be done on a bulletin board or on chart paper.)
5. Allow students to develop questions about the number of balloons that other students can answer. (e.g., How many balloons are red? How many balloons are striped? Are there more round balloons or long balloons?)

Variations:

- Students' pictures can be related to a theme or season (e.g., snowmen in the winter, flowers in spring).
- Students' drawings can be sorted and/or placed to create a physical graph based on given attributes.
- Students can take turns sorting the pictures and having other students guess what attribute was used for sorting.

Spill the Beans

Format: Whole class, partners

SOL Objectives:

K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.5, 1.1

Vocabulary: *and*, *plus*, *equal*, *make*, and other addition words

Materials: Raw lima beans painted on one side and left white on the other (or two-color counters); plastic cups; recording sheets; crayons

Time Required: 10 minutes, whole class; 15 to 20 minutes in partners

Directions:

1. Show students the beans. Count out five together. Ask, "What might happen if you spill the five on the floor? How might they land? What are the possibilities?" Let students share their ideas.
2. Shake five and spill them. Ask, "How did they land? How many colored? How many white? How many in all? What if we spilled them again, how might they land? Will it be the same?" Let the students share their ideas.
3. Shake the beans, spill them, and talk about how they land.
4. Teach students how to play "Spill the Beans." Students will use between five and nine beans. Count out the beans and place in a cup. Students say, "Shake, shake, shake, and spill," while shaking the cup and spilling the beans on the table. Have students separate the beans by colors and record how many of each by coloring a row on the recording sheet. (You may want to give specific directions for coloring, e.g., color all the colored counters first and then leave the rest white.) Repeat again and again until the students feel they have found all possible combinations.
5. Come back together as a class and talk about how students might know that they found all of the different combinations.
6. List all the combinations on the board and talk about the patterns that can be seen. Ask, "What happens to the number of colored beans as the number of white beans increases? Why is this so?"

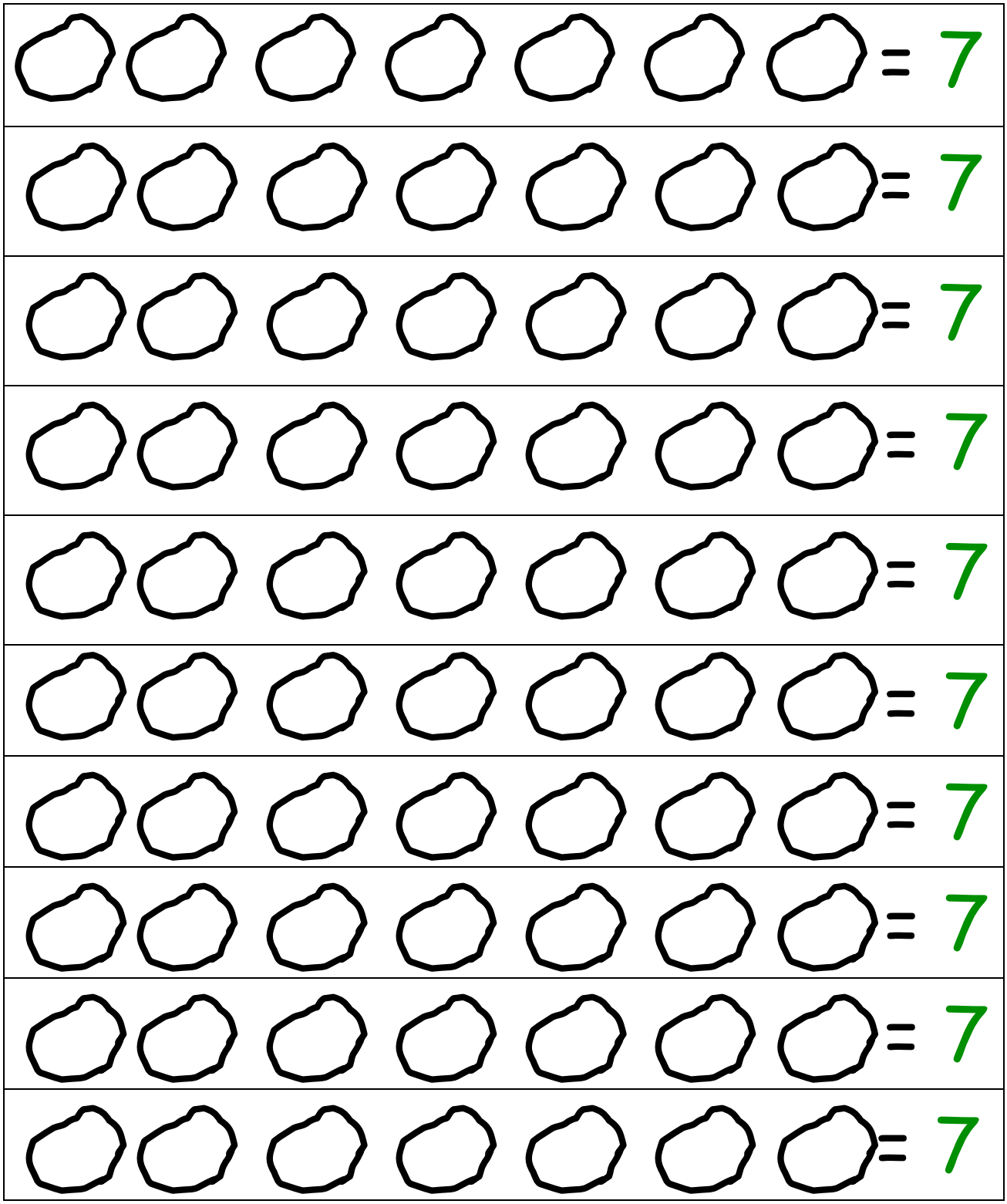
Exploration Questions:

- What are some ways you can make ___?
- What goes with _____ to make _____?
- Is there another way to make ___?
- How will you know when you have all the combinations of ___?

Variations:

- Try other numbers or sets of beans.
- Record numbers along with pictures of beans.
- Add symbols or number sentences to be completed, such as __ + __ = __.
- Have students cut the recording sheet apart by rows to organize their results and discuss the resulting patterns.

Recording Sheet (example for seven beans)



Splash!

Format: Small groups

SOL Objectives:

K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.1, K.3, K.5, K.6, K.12, K.17, 1.8

Vocabulary: *first*, *second*, *third*, *more*, *less*, *same*

Materials: *Splash!,* by Ann Jonas; counters; story mats

Time Required: 20 minutes

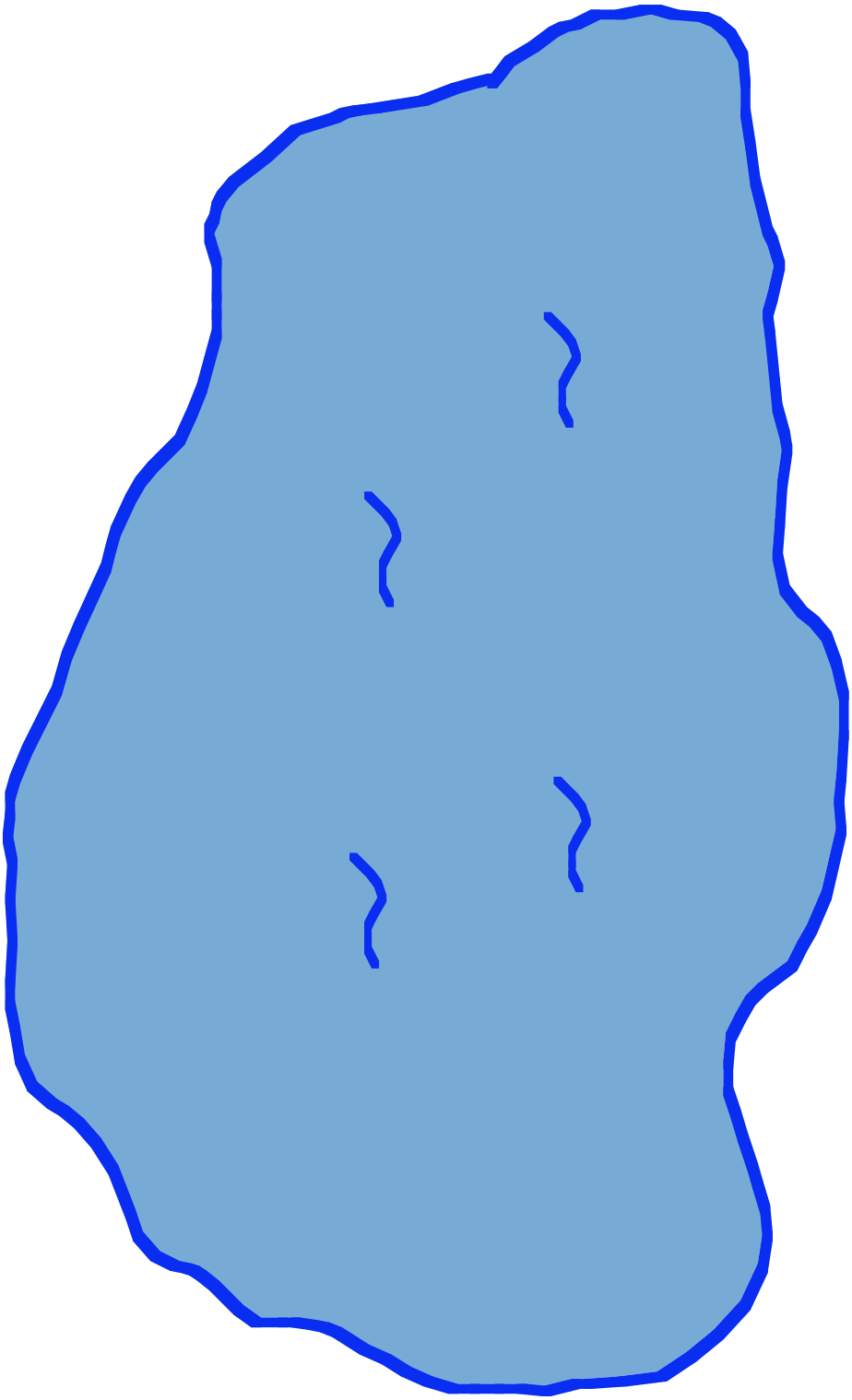
Directions:

1. Read the book, *Splash!*, to the class.
2. Provide each student with a story and some counters.
3. As you read the story, have students use the counters to model the characters' movements in and out of the pond.
4. Pause frequently to ask how many animals are in the pond and how many are out.
5. Have students compare the number of animals that are in the pond to the number of animals that are out of the pond. Ask, "Are there more, less, or the same number? How do you know?"
6. Ask students to identify the animals that went in the pond first, second, and third.
7. Create new "splash" stories for the students to act out and describe.

Variations:

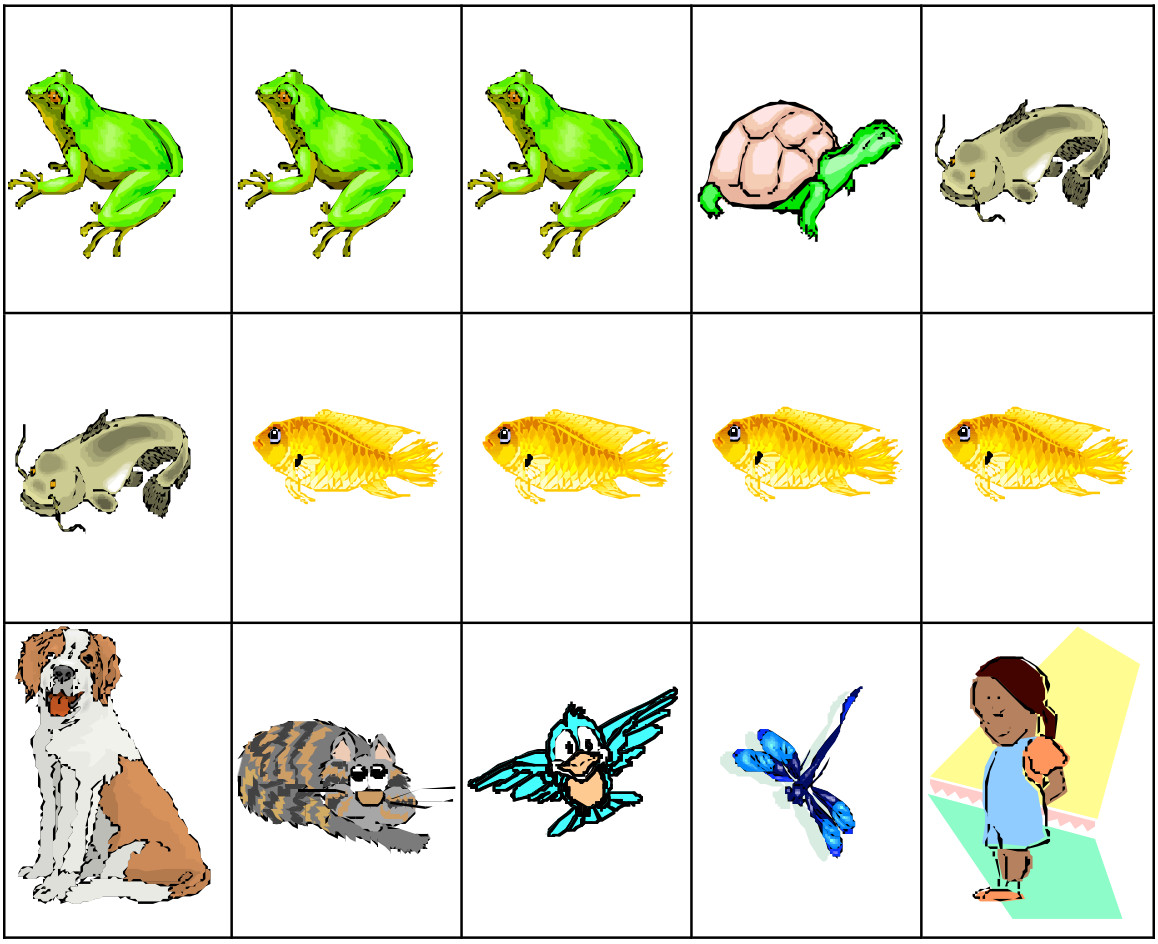
• Number sentences can be written to record the events in the story.
• Students can use the counters and mats to model and describe additional scenarios.

Story Mat

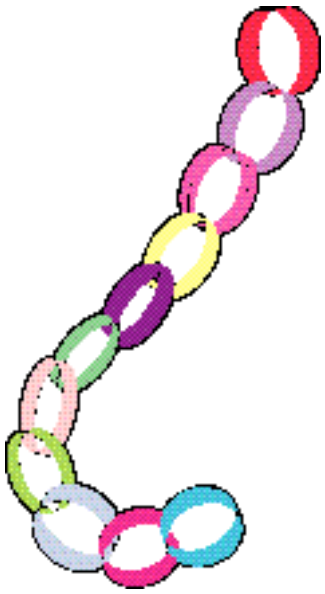


Counters

(copy and cut out one set for each student)



FIRST GRADE
Number and Number Sense



100s Chart Puzzle

Format: Small groups, partners

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.19, 1.21

Vocabulary: *more*, *less*, *counting up*, *counting back*, *counting words*, *numerals*, *100s chart*

Materials: 100s chart; recording sheets; pencils; overhead projector

Time Required: 30 minutes

Directions:
1. Review the number patterns on the 100s chart that you have been discussing with students. Ask, "What patterns do you see on the chart?" Point to a row and ask what students notice. Point to a column and ask what students notice. "What else do you see?"
2. Explain that you will be giving students a part of the 100s chart that has been cut out from the whole.
3. Students need to decide what numbers could go on the puzzle piece cut from the chart.
4. Ask students to explain how they decided which numbers to put on the puzzle piece.
5. Have small groups/sets of partners share their 100s chart piece with another group. "What do you notice about the other group's puzzle piece? Do the numbers on the piece make sense? Why or why not?"
6. Pull the groups together to discuss several of the puzzle pieces. "What number did the group put first? How did you figure out what number to write next? Do the numbers on the puzzle piece make sense? Why or why not?"

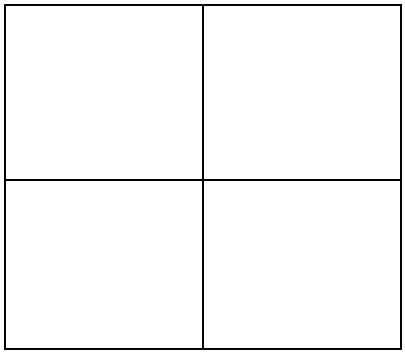
Exploration Questions:
- What patterns do you see on the 100s chart?
- What do you notice about the rows?
- What do you notice about the columns?
- How did you decide what numbers to place on the 100s chart?
- What number did you choose first?
- How did you figure out which number to write next?
- Do the numbers on the puzzle piece make sense? Why or why not?

Variations:
- Give a more abstract puzzle piece to students in need of more challenge (e.g., 3 x 3 puzzle piece, puzzle piece that resembles a staircase).
- Give students one number to place on the puzzle piece and have them deduce the other numbers.
- Record the thinking of those students who have difficulty expressing themselves on paper.
- Copy a 100s chart with pre-written numbers on cardstock and laminate. Cut the 100s chart into pieces and have students put the pieces together like a puzzle.
- Cover numbers on a 100s chart and have students decide which numbers are missing and write them on the chart.

Name _____

100s Chart Puzzle

Here is a piece of a 100s chart. Fill in the missing numbers that could go on the puzzle piece.



How did you know which numbers to put on the chart? Why did you place those numbers on the chart?

About How Many?

Format: Whole class, small groups, partners

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.3 The student will count forward by ones, fives, and tens to 100, by twos to 20, and backward by ones from 20.

1.4 The student will recognize and write numerals 0 through 100.

1.7 The student, given a familiar problem situation involving magnitude, will
a) select a reasonable magnitude from three given quantities: a one-digit numeral, a two-digit numeral, and a three-digit numeral (e.g., 5, 50, and 500); and
b) explain the reasonableness of his/her choice.

Related SOL: 1.18, 1.19

Vocabulary: *counting*, *estimate*, *group*, *objects*, *size*, *small*, *large*, *about*, *how many*, *most*, *least*, *benchmark*

Materials: Objects to count (e.g., bears, cubes, golf balls, beans, pom-pom balls, cotton balls); clear container; chart with headings "too small," "about right," and "too large"; markers for recording; sticky notes

Time Required: 30 to 45 minutes

Directions:

1. In preparation for this lesson, fill a clear container with objects to count, such as bears, cubes, or pom-pom balls. Count the objects as you place them in the container so you know how many objects are in the container.
2. Show students the container and explain that you need their help in figuring out how many objects are in it. "About how many _____ are in the container? Do you think there are more/fewer than 10? How do you know? Do you think there are more/fewer than 100? How do you know? How could we figure out how many _____ are actually in the container?" Record student ideas on chart paper or the board.
3. Show the students a group of 10 objects as a reference for estimating how many objects are in the container. Have them write on a sticky note about how many objects they think are in the container based on the group of 10 that you've shown them.
4. Have students refer to the chart of ideas recorded in Step 2 and try several. (If they suggest counting by ones, then have students count the objects by ones. If they suggest other ways of counting, have them try a few of their ideas.)
5. After they have determined how many objects are in the container, discuss the various ways that they counted the objects. "How did you count the objects? Were any of the ways that you counted the objects easier? Why did it seem that way? Were any of the ways that you tried to count the objects hard? Why did it seem that way?"
6. Have students refer back to their original estimates. Construct the following chart:

Too Small	About Right	Too Large

Ask the following questions: "What makes an estimate too small? What makes an estimate too large? What makes an estimate about right? How do you know?"

7. After discussion of the chart, have students post their original estimates according to the parameters that they as a class agreed would constitute an estimate for each category.
8. Review the information on the estimate chart and have students discuss it. Ask, "What do you notice about our estimates? Which category/group has the most? Which category/group has the least? Were any of our estimates about right? Why is estimation important? How could we make better estimates?"

Exploration Questions:

- About how many _____ are in the container?
- Do you think there are more/fewer than 10? How do you know?
- Do you think there are more/fewer than 100? How do you know?
- How could we figure out how many _____ are actually in the container?
- How did we count the objects?
- Were any of the ways that we counted the objects easier? Why did it seem that way?
- Were any of the ways that we tried to count the objects harder than others? Why did it seem that way?
- What makes an estimate too small?
- What makes an estimate too large?
- What makes an estimate about right? How do you know?
- What do you notice about our estimates?
- Which category/group has the most?
- Which category/group has the least?
- Were any of our estimates about right?
- Why is estimation important?
- How could we make better estimates?

Variations:

- Use fewer or more objects in the container, depending on student needs.
- Each group could have a container with the same number of objects but different objects in each. (For example, Group 1: pom-pom balls, Group 2: cotton balls, Group 3: cubes). The groups could then compare the similarities and differences among the objects in their containers.

Bears in Caves

Format: Whole class, partners

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8, 1.9

Vocabulary: *total*, *part*, *missing*, *counting on*, *counting back*, *equal*, *all*

Materials: Bear counters; plastic bowls/cups (caves); recording sheets; pencils

Time Required: 30 minutes

Directions:
1. Tell students which number they will be working on during the activity and have them brainstorm things that they know about that number. For example, the number "8" could tell how many legs a spider has or how many tentacles are on an octopus.
2. Record their ideas on chart paper/board to begin the conversation about the number being discussed.
3. Have the partners count the number of bears they will be working with during the lesson, and let them know that this number indicates how many bears they will have in all.
4. Each set of partners should get a plastic bowl/cup to represent the bear cave.
5. Explain that students will take turns with their partner hiding some of the bears in the cave (under the bowl/cup) and leaving the rest outside the cave.
6. Students will figure out how many bears are hiding in the cave, given the total number of bears and the number of bears outside the cave.
7. Students will continue taking turns hiding bears in the cave until they have found different combinations for the total number.
8. Pull the students back together for a whole-class discussion of the different combinations they found for the number, and the strategies they used to decide how many bears were hiding inside the cave.
9. List all the different combinations on chart paper/board, and discuss what the students notice.

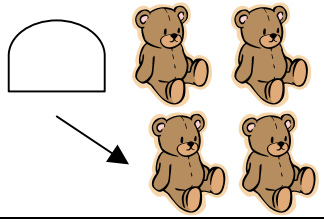
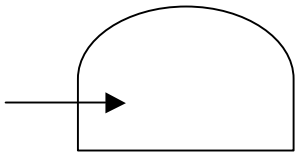
Exploration Questions:
- If _____ bears are outside the cave, how many are inside the cave? How do you know?
- How did you determine how many bears were inside the cave?
- Do you notice any patterns with the different combinations you found?

Variations:
- Use numbers that meet individual student needs.
- Struggling students can uncover the bears inside the cave if they are having difficulty figuring out the unknown part.
- Have students write a number sentence to show how they determined the missing part.

Name _____

Bears in Caves

There are _____ bears in all. Write how many bears are outside the cave. Write how many bears are inside the cave.

Outside	Inside	Total Bears
		

Constructing Numbers

Format: Whole class, small groups, partners

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.2 The student will group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value

1.4 The student will recognize and write numerals 0 through 100.

Vocabulary: *how many*, *groups of tens*, *ones*, *number word*, *pictures/representation*, *counting*, *collection*, *total*

Materials: Objects for constructing numbers (cubes, beans, cups, base-ten blocks, 10-frames); number cards 11–100; recording sheet; pencils

Time Required: 40 to 50 minutes

Directions:

1. Before the activity, construct number cards 11–20. You can use index cards or enlarge a 100s chart and cut out the boxes.
2. Introduce the activity by having a student choose a number card from the set of cards. Write the number on the board/chart paper and ask students to identify the number you wrote.
3. Have students brainstorm different ways they could use counters to make the number. Using the number 46 as an example, the students may represent the number using 46 counters organized randomly, 46 counters in groups of two, four groups of ten and six ones, or two groups of ten and 26 ones. Ask students: "How could you show 46? How did you count the objects to make sure that you have a total of 46? Were any of the ways that you counted faster than other ways? Why did it seem that way? Were any of the ways that you counted slower than other ways? Why did it seem that way?"
4. Explain to the students that you would like them to make 46 using as many groups of ten as they can. Before they begin, pose the following questions: "How many groups of ten do you think you will have? How many will be left over? How do you know?" As students are working, walk around and observe the strategies they are using to group the counters using tens. When students have completed this task, discuss the strategies they used to make 46. Ask, "How many groups of ten did you make? How many were left over? What does this have to do with how many counters we have in all?"
5. Explain to students that they will be working in small groups to construct numbers using as many groups of ten as they can. They will use a recording sheet to record the number they choose from the set of number cards.
6. Next, they should use counters to determine how many groups of ten and ones (leftovers) they will have. To show their work on their recording sheets, they may use 10-frames, pictures of base-ten blocks, drawings of sticks (groups of ten) and dots (ones), or connecting cubes.
7. Students should record how many groups of ten and ones they have and the number word that tells how many.
8. Set the students to work on constructing numbers. Observe how they are constructing the number using counters and how they are determining how many groups of ten and ones are in their number.
9. After students have had time to work on several numbers, pull the students together to discuss a number and how many groups of ten and ones are in this number. Ask, "How did you make _____? How did you count the objects to make sure that you have a total of _____? How many groups of

ten did you make? How many were left over? What does this have to do with how many counters you had in all?

Exploration Questions:

- How could you show _____?
- How did you count the objects to make sure that you have a total of _____?
- Were any of the ways that you counted faster than other ways? Why did it seem that way?
- Were any of the ways that you counted slower than other ways? Why did it seem that way?
- How many groups of ten do you think you will have?
- How many will be left over? How do you know?
- How many groups of ten did you make?
- How many were left over?
- What does this have to do with how many counters we have in all?

Variations:

- Give students the picture of the number. Ask, "How many are in the picture? How many groups of ten do you see, and how many ones are left over? What is the number word?"
- Give students the number word and have them determine the number, as well as how many groups of ten and ones are in the number. Have students create a representation/picture of how many.
- Use larger or smaller numbers, depending on student needs.
- Give students a bag of objects to count. Ask students to write how many, draw a picture to represent how many, tell how many groups of ten and ones are used in the numbers, and write the number word. Be sure to count the objects in the bags and make note of the number before students complete this variation of the activity.

Name _____

Constructing Numbers

How many?

_____

Make a picture/representation to show how many.

_____ groups of ten _____ ones

_____
number word

Cube Connections

Format: Whole class, partners

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: K.5, 1.18, 1.19

Vocabulary: *make*, *build*, *add*, *and*, *plus*, *equal*, *total*

Materials: Cubes; recording sheets; crayons/pencils for recording

Time Required: 30 to 40 minutes (per number)

Directions:
1. Explain to students that they will be connecting cubes to create a given number, such as 10, and finding ways to make that number with the cubes. (The recording sheets for this activity are to be completed as students discuss a given number—not all in one lesson.)
2. Each partner group needs to select two colors of cubes to use to make the given number.
3. After students have selected the colors, ask them to determine how to build the given number using the two colors of cubes.
4. Show students how to record a picture of what they made, as well as the numbers that represent the quantities of cubes used. (Record the same color first for each cube combination.)
5. Have students continue working to build the given number in different ways and record the solutions on the sheet.
6. Gather students together as a class to discuss the different ways they made the given number.
7. Record their ideas with numbers and pictures on chart paper or the board, and ask them what they notice about the shared ideas.

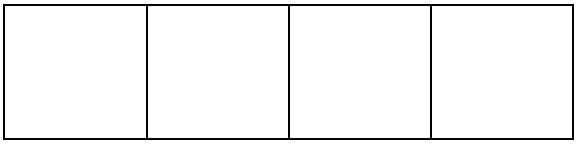
Exploration Questions:
- How did you make _____?
- How do you know that _____ and _____ make _____?
- What patterns do you see?
- Are there other ways to make _____?
- How do you know we have found all the different ways to make _____?

Variations:
- Use smaller or larger numbers, depending on needs of the students.
- Have students write number sentences using the "+" and "=" signs on the recording sheets.

Name _____

Cube Connections

4



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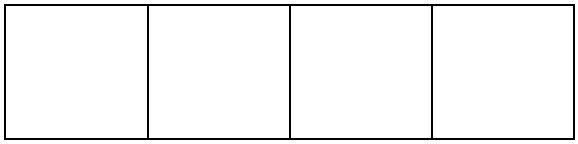

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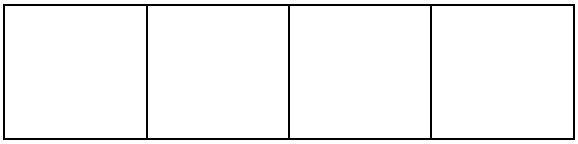

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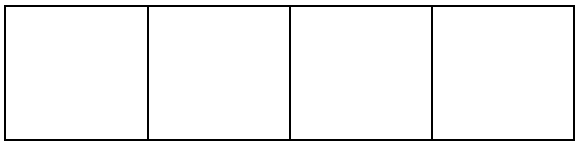

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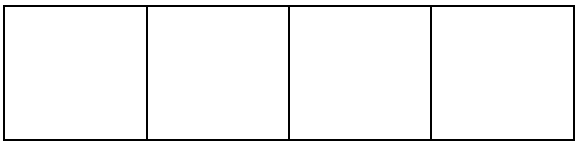
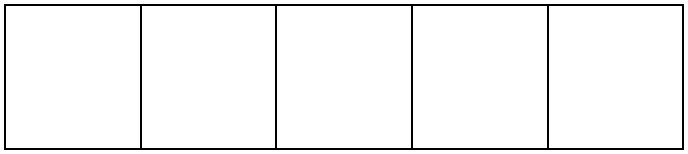


_____ and _____ is 4

Name _____

Cube Connections

5



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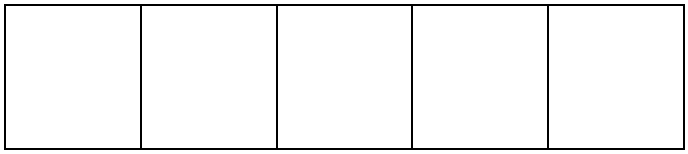

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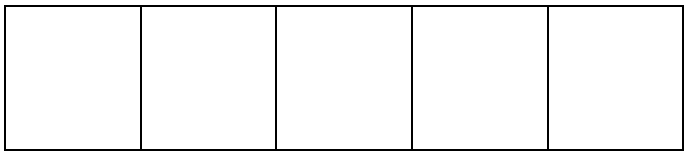
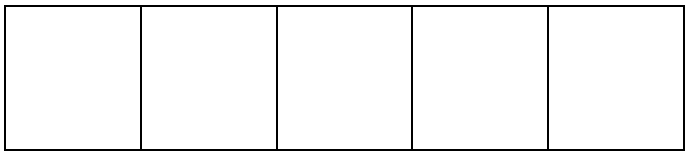
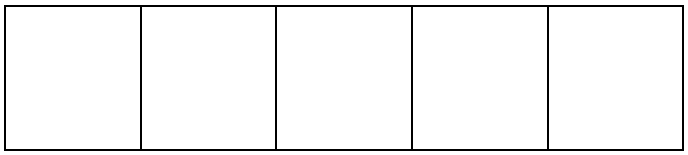


_____ and _____ is 5



_____ and _____ is 5



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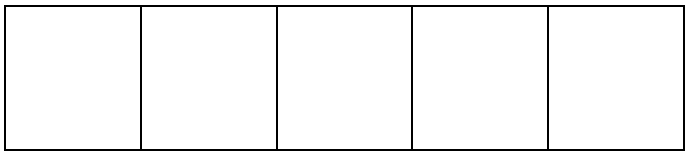

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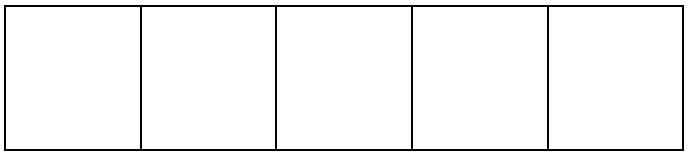

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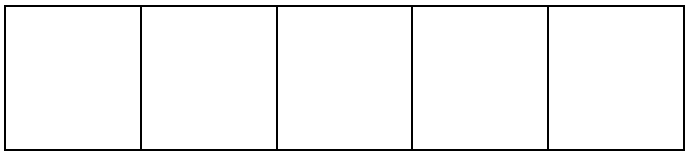
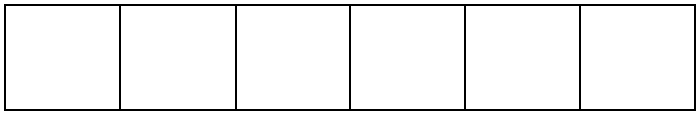


_____ and _____ is 5

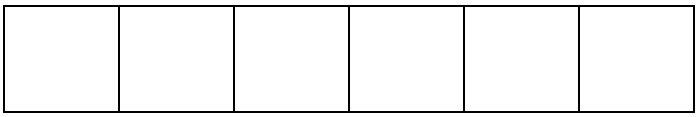
Name _____

Cube Connections

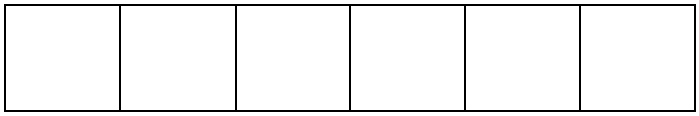
6



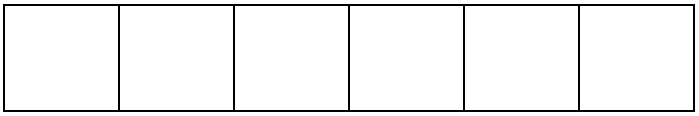
_____ and _____ is 6



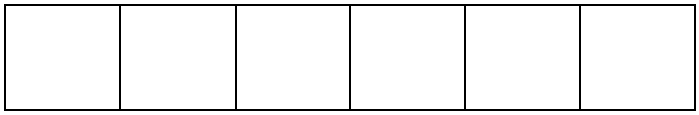
_____ and _____ is 6



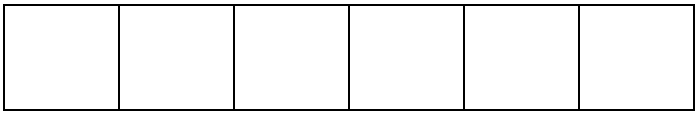
_____ and _____ is 6



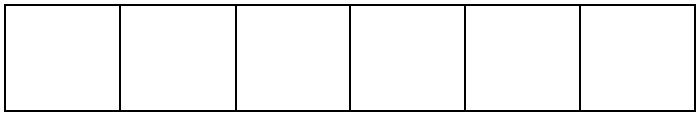
_____ and _____ is 6



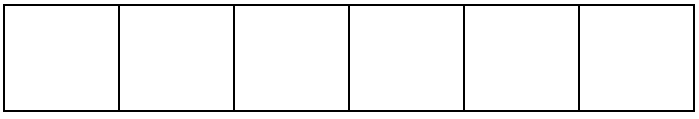
_____ and _____ is 6



_____ and _____ is 6



_____ and _____ is 6

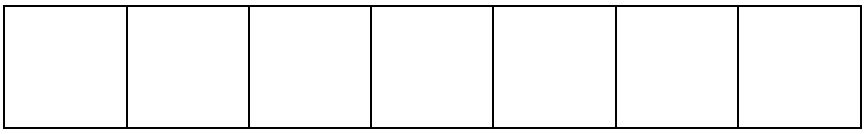


_____ and _____ is 6

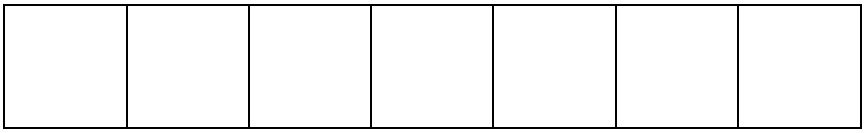
Name _____

Cube Connections

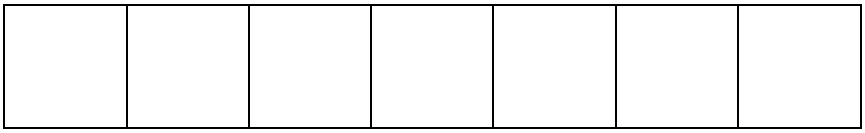
7



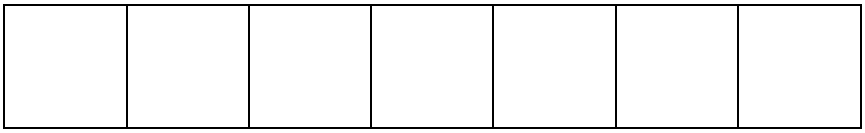
_____ and _____ is 7



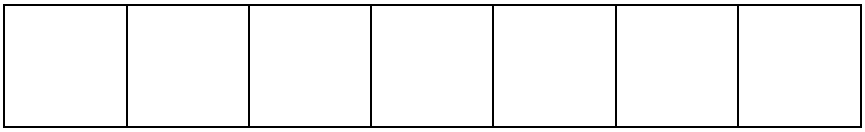
_____ and _____ is 7



_____ and _____ is 7



_____ and _____ is 7



_____ and _____ is 7

7

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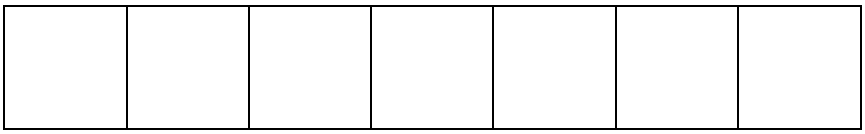
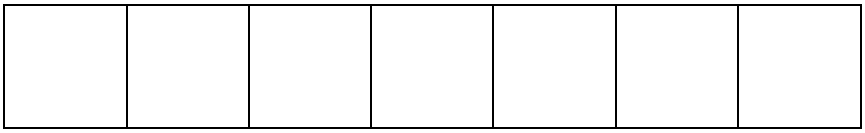
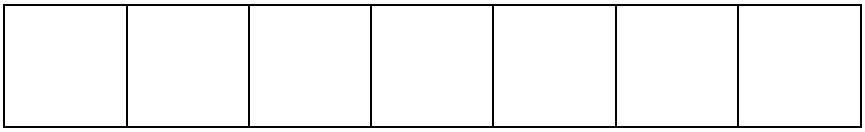


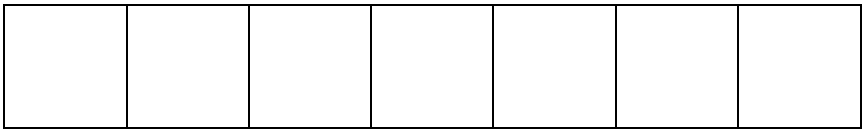
_____ and _____ is 7



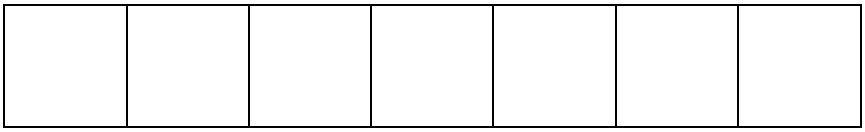
_____ and _____ is 7



_____ and _____ is 7



_____ and _____ is 7

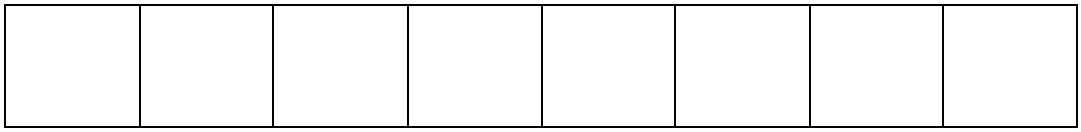


_____ and _____ is 7

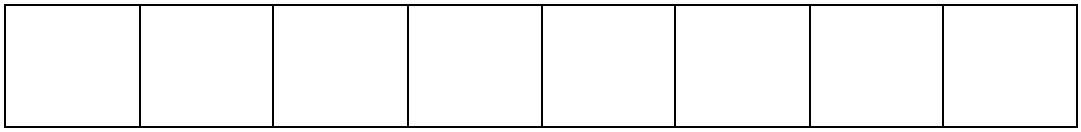
Name _____

Cube Connections

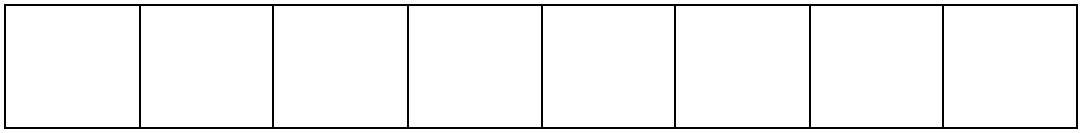
8



_____ and _____ is 8



_____ and _____ is 8



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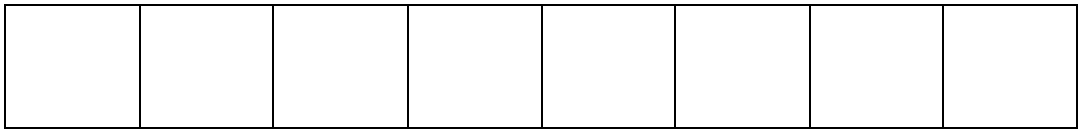
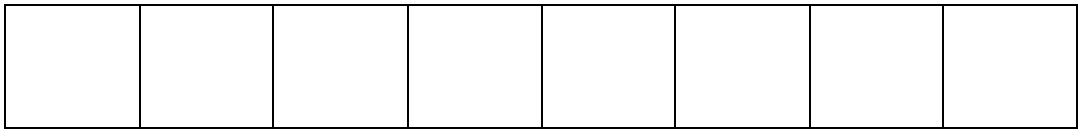


_____ and _____ is 8



_____ and _____ is 8

8

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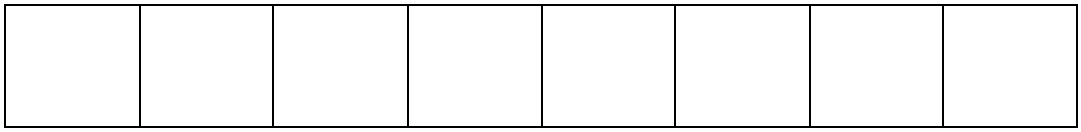
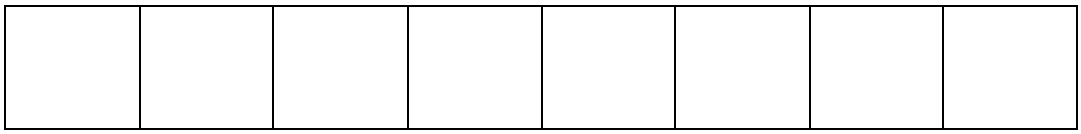
_____ and _____ is 8



_____ and _____ is 8

_____ and _____ is 8



_____ and _____ is 8

Name _____

Cube Connections

9

_____ and _____ is 9

_____ and _____ is 9

_____ and _____ is 9

_____ and _____ is 9

_____ and _____ is 9

9

(continued)

_____ and _____ is 9

_____ and _____ is 9

_____ and _____ is 9

_____ and _____ is 9

_____ and _____ is 9

Name _____

Cube Connections

10

_____ and _____ is 10

_____ and _____ is 10

_____ and _____ is 10

_____ and _____ is 10

_____ and _____ is 10

10

(continued)

_____ and _____ is 10

_____ and _____ is 10

_____ and _____ is 10

_____ and _____ is 10

_____ and _____ is 10

Kids on the Playground

Format: Whole class, partners, small groups

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8, 1.9, 1.18, 1.19

Vocabulary: *number combinations*, *word problems*, *pictures*, *numbers*, *words*

Materials: Counters (e.g., cubes, tiles, chips, blocks); crayons/pencil to explain thinking; paper

Time Required: 30 to 45 minutes

Directions:
1. Introduce the activity by asking students to think about fun activities they enjoy on the playground. Ask, "What are some things you do on the playground? Who likes to swing? Who likes to play ball? Who likes to climb on the monkey bars? How many of you like to slide? How many of you like to do more than one thing? Do you do the same activity everyday, or do you like to do different things? Why do you like to do different things?" (You could focus on one playground activity, such as swinging, and ask the students to discuss how many girls like to swing and how many boys like to swing. "Could these numbers change from day to day? Why?")
2. Explain to the students that they will be working with a partner or in a small group to solve the following playground problem: There are 10 children on the playground. How many could be boys? How many could be girls? Instruct students to explain their thinking using pictures, numbers, and words.
3. Discuss the problem with students. "What are we trying to figure out? How many children are on the playground altogether? How could we record our answers?"
4. Students can use materials of their choice to solve the problems, but they must record their solutions (see recording sheet).
5. Allow student groups to work on the problem and find several ways to solve it.
6. Monitor students as they work to see how they are approaching the problem. What strategies are they using? Are they putting objects together randomly? Do they know their number combinations? Does each combination total 10? What difficulties are students having? What are students doing well?
7. After students have had time to explore the problem, pull them back together as a whole class to discuss the various combinations of girls and boys they found to make 10.
8. Record various students' solutions on chart paper or the board during the whole class discussion.

Exploration Questions:
- What is the problem asking?
- How could you record your thinking?
- How many children are there altogether?
- How did you solve the problem?
- Do you have 10 children on the playground altogether? How do you know?
- Do you need more? Fewer?
- If there are _____ girls, how many boys will there be? How do you know?

- Is there another way to solve this problem?
- How do we know that we have found all the ways to solve this problem?
- What do you notice about the combinations we have found?
- How did you record your thinking?

Variations:
- Use a smaller or larger number for students to explore, depending on student needs.
- Find all of the solutions (number combinations) for the problem.
- Have students write their own word problems to illustrate various combinations totaling 10.

Name _____

Kids on the Playground

There are 10 children on the playground. How many could be boys? How many could be girls? Explain your thinking using pictures, numbers, and words.

Largest Number

Format: Whole class, small groups, partners

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.2 The student will group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value.

1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 2.1, 2.2

Vocabulary: *more*, *less*, *counting up*, *counting back*, *number words*, *ten less*, *ten more*, *numerals*, *100s chart*

Materials: Cubes; number cards (0–9); 100s chart; recording sheets; pencils

Time Required: 45 minutes to 1 hour

Directions:

1. Begin the activity by having students compare two numbers, such as 24 and 32. Ask, "How could you build 24 using cubes? How do you know you have the correct amount of cubes to show 24? How could you build 32 using cubes? How do you know you have the correct amount of cubes to show 32? Which number is larger? How do you know? Which number is smaller? How do you know?"
2. After students determine which number is larger and why, ask them to assess which number would be *ten more*. Students can use materials of their choice (e.g., cubes, 100s chart, 10-frames).
3. Walk around and monitor students' strategies for solving the problem.
4. After they have explored what *ten more* would be, discuss the strategies they used. Ask, "How did you know which number was *ten more*? What did you do to figure this out?" Record student strategies on chart paper/board. Compare the various strategies. Ask, "What is similar? What is different?"
5. Ask students to determine which number would be *ten less*. Students can use materials of their choice (e.g., cubes, 100s chart, 10-frames).
6. Walk around and monitor students' strategies for solving the problem.
7. After they have explored what *ten less* would be, discuss the strategies they used. Ask, "How did you know which number was *ten* less? What did you do to figure this out?" Record student strategies on chart paper/board. Compare the various strategies. Ask, "What is similar? What is different?"
8. Next, have students work with a partner or in small groups. Each group needs a set of number cards.
9. Have each group choose two number cards and record the two numbers they selected on the recording sheet.
10. Students then need to use the two cards they chose to make the largest two-digit number they can.
11. Have students construct their number using cubes and record a picture of their number.
12. Next, they should write the number word for the number they made.
13. On the recording sheet, have students use pictures, numbers, and words to explain how they know they've made the largest number they could with the cards selected.

14. Have students construct and write the number that would be *ten less* than the number they have made. Have them record a picture of the number that is *ten less* and also write the number word on the recording sheet.
15. Pull students together as a class to discuss the strategies they used to construct the largest number from the cards. Ask, "How did you decide which number is *ten less*?"

Exploration Questions:

- How could you build the number _____ using cubes?
- How do you know you used the correct number of cubes to show the number?
- Which number is larger? Smaller? How do you know?
- What is the largest number you can make with the two cards? How do you know?
- What strategies did you use to figure this out?
- Which number would be *ten more* than the number? How do you know?
- Which number would be *ten less* than the number? How do you know?
- What did your representation of the number look like? How does it relate to the number word that you wrote to tell how many?

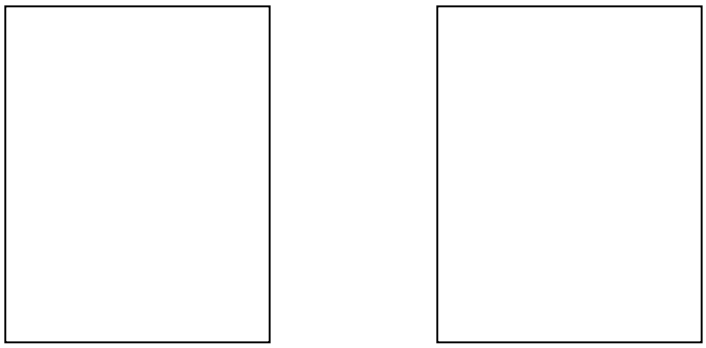
Variations:

- Students could use three cards to make the largest three-digit number from the cards.
- Students could find which number is *20 more*, *20 less*, *15 more*, and *15 less*.

Name _____

Largest Number

Pick two cards and write the numbers you chose on each rectangle below. Then, use the cards for the following problems.



Make the largest two-digit number you can using the number cards. Draw a picture of the number and write the number word for it.

_____
largest number

Picture of largest number

_____
number word

How do you know it is the largest number you can make with the cards?

Draw a picture and write the number that is *ten less* than the number you made with the number cards.

_____

Picture of Number

_____
number word

Place Value Designs (with Pattern Blocks)

Format: Small groups

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.2, 1.3

Vocabulary: *tens*, *sets*

Materials: Pattern blocks in bags to match the number of groups, with fewer than 99 per bag (Pattern blocks projected on an overhead or magnetized pattern blocks are options for the modeling.)

Time required: 45 minutes

Directions:
1. Show students various bags of pattern blocks. Ask students: "How many blocks do you think may be in the bags? How would you know? What can you do to find out?" (Most students will say, "Count them." You may want to suggest that counting by ones will take a *long* time and that they may make a mistake.) Suggest: "Let's try another way."
2. Explain to students that they are going to make as many designs as they can with 10 pattern blocks. Each design will use 10 blocks and may include more than one color or shape. At this point, you should model several designs using 10 blocks. Be sure to comment on each design as it is completed. Have the students note how many squares or how many triangles were used in the design. Have them note which shapes were used more and which were used less, and then find the difference between the two.
3. After modeling several designs, distribute the pattern blocks into small cooperative groups, and have the students continue making different designs using 10 blocks. As you monitor the groups, Ask, "How many different designs have you made? How many blocks did you use? How do you know? How could that be written? Is there another way to write it? How do you know? How is that the same or different?" This information can be recorded and left facedown on the table with the cooperative group.
4. Each group should then observe the designs of the other cooperative groups for comparison. The number of designs and blocks used should be recorded at each station.

Exploration Questions:
- What did you do in this activity to speed up counting?
- How does this help you know how many blocks you have in your bag?
- What are other things you may want to count by tens?

Spill!

Format: Small groups, partners

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8, 1.18

Vocabulary: *left, right*

Materials: Part-Part-Whole mat, or 9 x 12 sheet of newsprint folded in half, "hamburger style," to show two parts; six two-color counters per student or group of students; cups; paper to record the results

Time Required: 30 minutes

Directions:
1. Explain to students that they will be finding ways to make 6 (or any other number).
2. Spill six two-color counters from the cup and lead the discussion to get students to describe the colors of the counters that they see (e.g., "I see two red counters and four yellow counters").
3. Have students sort the counters onto the folded paper, according to color. On a chart marked with a "red" column and a "yellow" column, record the numbers to match what spilled from the cup. Do this several times.
4. Arrange the students in pairs. The first student spills the counters from the cup. The second student puts the red counters on the left and the yellow counters on the right. The first student then writes "_____ red and _____yellow" on the recording sheet. Have the partners trade roles and repeat several more times. This should allow each pair of students to see all the possible ways to make 6.
5. Have students rejoin as a class and discuss what they found. Record the different number combinations in order (e.g., 0,6; 1,5; 2,4) on a chart or black/white board for students to see and discuss.

Exploration Questions:
- Is it possible for the number of red counters to match the number of yellow counters? When does that happen?
- Is it possible to have zero red counters? When would that happen?
- How many ways are there to make 6?
- How do you know you are finished?

Name: _____

Red	Yellow

Name:_____

I have _____red and ____ yellow.
I have _____red and ____ yellow.
I have _____red and ____ yellow.
I have _____red and ____ yellow.
I have _____red and ____ yellow.
I have _____red and ____ yellow.
I have _____red and ____ yellow.

I Found It!

Format: Small groups, learning center

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8

Materials: Two sets of cards, each with one to six stickers; two blank cards

Time Required: 15 minutes

Directions:

1. Prepare two sets of numeral cards (you can use the number cards from a deck of cards, with the face cards removed).
2. Have the students place all of the cards facedown in a stack, or spread out in a concentration factor.
3. Direct students to work in pairs to find two cards that make 6, or another number you are investigating. (If you are investigating another number, the cards in the stack need to reflect that. If you are looking for combinations to make 8, for example, you will need to add the cards for seven and eight.)
4. Each student turns over two cards at a time.
5. If the card values combine to make 6, the student may keep the cards. Cards that do not make 6 are returned to the bottom of the stack.
6. Play continues until all possible card combinations that make 6 are used.

Exploration Questions:

- How many ways are there to make 6?
- How do you know you are finished?

Domino Math

Format: Small groups, learning centers

SOL Objectives:
1.1 The student will count objects in a given set containing between1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8, 1.18

Materials: Set of dominoes; paper bag, basket, or tub; recording sheets

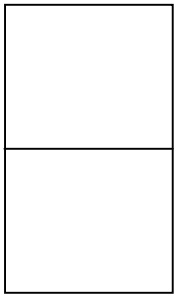
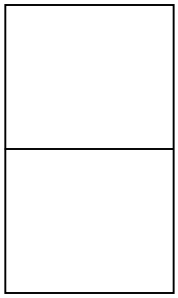
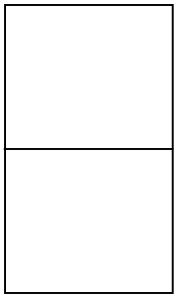
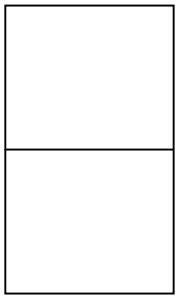
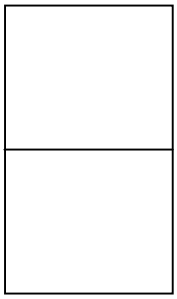
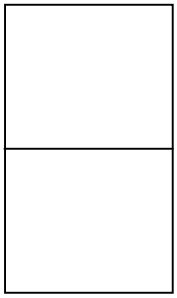
Time Required: 15 minutes

Directions:
1. Put a set of dominoes in a paper bag, basket, or tub—preferably one that obscures students' view of the dominoes.
2. Select a target number, or have students suggest one.
3. Have a student reach into the bag/basket/tub and draw a domino. If the dots on the domino add up to the target number, then the student should record the number combination that appears on the domino and keep it faceup. If the number does not match the target, the student should turn the domino facedown in a separate pile and draw again. After two chances, play then moves to the next student.
4. After students have drawn all of the dominoes from the bag, they should have the "set" of number combinations that are possible for the target number.
5. The students' recording sheets should list all of the possible combinations they found.

At another opportunity, the students could investigate another target number.

Name: _____

Domino Recording Sheet

My domino looked like this: 	My domino looked like this: 
My domino looked like this: 	My domino looked like this: 
My domino looked like this: 	My domino looked like this: 
My domino looked like this: 	My domino looked like this: 

Seven Up

Format: Whole class

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

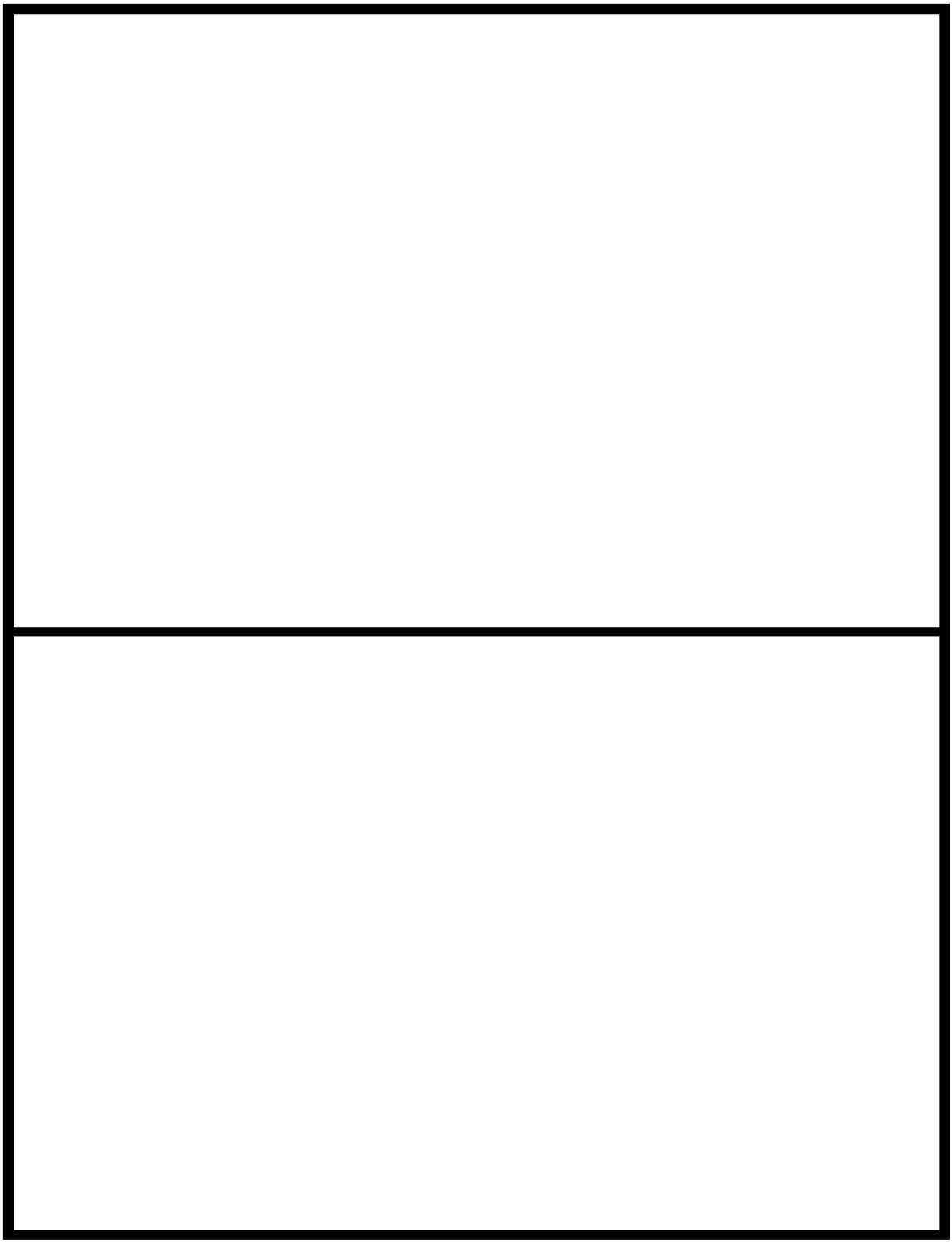
Related SOL: 1.8, 1.18

Materials: Part-Part work mat, or folded sheet of newsprint as a substitute; color tiles (each student should have only one color); paper

Time Required: 15 minutes

Directions:
1. Place all seven tiles on the left side of the Part-Part mat (or folded newsprint). Have each student do the same.
2. Count the tiles aloud with the students. Ask, "How many tiles? How did you know?" Show the students that *all* seven tiles are on one side of the work mat and zero tiles are on the other side.
3. On a sheet of paper write, "____ and _____." Show them how to write in the 7 and the 0.
4. Move one tile from the left to the right. Ask, "How did that change the mat? What do you see now?"
5. Record the change and continue in this manner until all the number combinations for 7 are recorded.

Exploration Questions:
- How many ways did you make 7?
- Was the same number ever on both sides of the Part-Part mat?
- How do you know you have all the possible combinations? Why or why not?



Part-Part Mat

Name: _____

Seven Up Recording Sheet

I have _____ and _____.
I have _____ and _____.
I have _____ and _____.
I have _____and _____ .
I have _____ and _____.
I have _____ and _____ .
I have _____ and _____ .
I have _____ and _____ .

More, More!

Format: Small groups

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.18

Materials: Two-color counters; 10-frames; number cubes or number cards

Directions:

1. Direct students to choose 10 counters and a 10-frame (the 10-frames on the next page can be copied and laminated). If necessary, review 10-frame rules: always fill the top row first; always use red first, then yellow.
2. Place counters and 10-frames in the center of each table, and direct students to choose theirs.
3. Choose random numbers by tossing number cubes or selecting cards. Ask students to place the corresponding number of counters on their 10-frames to match the random number selected.
4. Ask students to place *one more* counter, then *two more* counters for each number.
5. Ask how many counters would there be with *one more* and *two more*. Record those new numbers on the chart/whiteboard (see below).

Number	1 More	2 More
6	7	8

10-Frames

Crazy Eights

Format: Independent work

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8, 1.18

Materials: Construction paper or paper plates for spider body and head; chenille stems/pipe cleaners (two colors); glue; tape; roll-paper chart (see example)

Directions:

1. Ask students, "How many legs does a spider have?" Explain that each student will be creating a spider with eight legs made from the colorful chenille stems.
2. Place chenille stems in the center of each table, and direct students to each choose eight, making sure to select some of each color.
3. Have each student take two circles—one large circle for the spider's body, one small circle for its head.
4. Students should attach chenille stems to the spider body, using glue on the paper or by poking the stems through the paper plates.
5. Instruct students to count one color of legs first (as the first addend) and then to count the other color of legs (as the second addend); this will demonstrate the commutative property.
6. Examine the spiders with students as they sort/count the number of legs by color. Have students then attach their spiders to the roll-paper chart in the appropriate place.

Exploration Questions:

- How is your spider the same or different from the others?
- How many of each leg color did you count?
- Where does your spider go on the chart? How can you tell?

Example of a Chart Made from Roll Paper

0 and 8	1 and 7	2 and 6	3 and 5	4 and 4	5 and 3	6 and 2	7 and 1	8 and 0

Have students place spiders in the column where they belong, based on leg color, making sure to count the same color first for each student's spider.

In or Out

Format: Small groups, partners

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8

Vocabulary: *plus*, *equals*, *sum*

Materials: Ten two-color counters for each set of student partners; newsprint

Directions:

1. Model the game by placing newsprint sheets on the floor as a game mat. Explain: "I have 10 counters. I am going to gently toss my counters over the game mat. What do you think will happen? OK, let's see how many counters land on the mat and how many counters land off the mat."
2. Record total number of counters at the top of the game grid and the number of counters on and off the grid.
3. Repeat the above procedure, choosing individual students to gently toss the counters (choose students who may need additional practice in gentle tossing) and to record on the grid how many counters land on and off the mat.
4. Have students then join their partners to play the "In or Out" game together.
5. Circulate and monitor the groups. Those students having difficulty can join you in a separate area and use manipulatives to count objects and also to play the "In or Out" game.

The Circle Counting Game

Format: Whole class, small groups

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

Materials: None

Directions:

1. Direct students to stand in a circle.
2. Designate one student as the starter, who will begin counting to a designated number (e.g., 20). The student to the starter's right will say the next number in the sequence; continue around the circle until the designated number is reached.
3. The student who says the last number of the sequence sits down, and the sequence begins again skipping over those who are sitting down until only one student is left standing.
4. Repeat the game, starting with the same student, in the same direction, using the same sequence and have students predict who will be left standing. This can be played in any length sequence and with any number of students. Skip counting may be used as well.

The Hidden Hand Game

Format: Small groups, partners

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8

Materials: Small manipulatives, such as beans, two-color counters, or teddy bear counters that fit in your hand

Time Required: 20 to 30 minutes

Directions:

1. Select a certain number of items (e.g., 10), and put some in each hand.
2. Open one hand to reveal the items. Have the other player count those items.
3. Then ask, "Knowing that there were 10 items total, how many remain in the closed hand?"
4. Demonstrate this several times.
5. When students are comfortable with how to play the game, break them into small groups or pairs to play together.

Count On

Format: Small groups, partners

SOL Objectives:

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.3, 1.8

Materials: One numeral cube and one dot cube per group

Directions:

1. Model the exercise for students by rolling the numeral and dot cubes. Record the numeral first and the dot second. If you roll a "5" on the numeral cube, and "3 dots" on the second cube, announce "5" and then count forward, using the dots on the second cube: "6, 7, 8." (Some students will need to touch the dots to count on.) Demonstrate this several times showing students how to use the numeral first and to "count on" using the corresponding number of dots from the second cube.
2. Divide students into pairs or small groups. To keep as many students playing as possible, instruct students that when one rolls the cubes, the other can count the numerals; and then the students switch roles.
3. After having played the game for a while, students can use a small whiteboard, or paper on a clipboard, to write the numbers that were counted on, or the addition sentence that was generated on the cubes.

How Many of Each?

Format: Individual

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.8, 1.9

Materials: Blank paper; counters or cubes

Directions:
1. Tell students that they are going to make a picture of two kinds of things that add up to 10. They can draw two kinds of animals, two kinds of food, two kinds of toys—anything they want, but the total must equal 10.
2. Demonstrate by illustrating two kinds of things that equal 10.
3. Tell students to decide which two kinds of things they want in their picture and how many of each type they want to have.
4. Distribute blank paper to students for their illustrations. They can talk with each other about possibilities but encourage them to think of their own ideas.
5. Students' illustrations should have 10 total things and include the number of each thing they've drawn. Alternatively, students can verbalize their picture using numbers and/or words.

Variations:
- Use a number larger than 10, or combine solutions of two students to make 20 things.

Me!

Format: Small groups, partners

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.18.

Materials: Number cards (can be a regular card deck with face cards removed), one set per pair of students

Directions:
1. To model how to play the game, pick a student to play with you.
2. Mix the cards and distribute them evenly between the two players, placing the stack of cards facedown in front of each player.
3. Both players turn over the top card in their stacks.
4. The player with the larger number says, "Me!" (Should both cards be the same value, each player turns over another card.)
5. The game is over when all cards have been turned over.
6. Following the demonstration, distribute card sets to each team for play.

Variations:
- Turn over two cards each, combine the numbers, and call "Me!" if the student's number is larger.
- Look for the smaller number instead of the larger number.
- Play with three players.

Paper Chains

Format: Whole class, small groups, individual

SOL Objectives:

1.5 The student will identify the ordinal positions first through tenth, using an ordered set of objects.

Vocabulary: *ordinal number words* (first, second, etc.), *top*, *bottom*, *left*, *right*, *place*, *position*, *line*, *loop*

Materials: *Henry the Fourth* by Stuart Murphy; 1-inch strips of construction paper (pre-cut and in different colors); glue

Time Required: 45 minutes

Directions:

1. Read the book, *Henry the Fourth*
2. Discuss the story and the ordinal number words in the story. Ask: "How many dogs come before Henry? How do you know? If there were five dogs, what would be the last dog's position? If there were three more dogs what would be the position of the last dog in the show?"
3. Give each student 10 1-inch strips of different colored construction paper.
4. Have each student make a paper chain with 10 paper strips in the same color order. (Before the lesson, you should predetermine the order of the different colors for the paper chain.)
5. Demonstrate how to glue the two ends of the first paper strip together in a loop. Have students get the second color they are supposed to use and put it through the first loop and then glue the two ends together. The loops should be intertwined to form a chain. Continue this process with students until their chain has 10 paper loops.
6. Working with a partner or in a small group, have students take turns asking questions about the chains. For example, "What color is third if the chain is facing the door? What color is seventh? In which place is the blue loop? The green loop?
7. Have students turn their chains in another direction, and continue asking each other questions about the ordinal positions of the colored loops.

Exploration Questions:

- In which place is the (color) loop?
- How about the (color) loop? How do you know?
- Which color is first, fifth, tenth?
- How many loops come before yellow (or another color)?

Variation:

- Have students make a five-loop paper chain using two colors of construction paper strips. They should arrange their strips in an AB, AAB, etc., pattern. Challenge students to determine which color would come seventh if the pattern continued? Tenth? Ask them to explain their thinking.

Sharing

Format: Whole class, small groups, partners

SOL Objectives:

1.6 The student will identify and represent the concepts of one-half and one-fourth, using appropriate materials or a drawing.

Vocabulary: *equal*, *fair shares*, *parts*, *whole*, *total*, *fraction*

Materials: Oranges (e.g., cookies, brownies, candy bars); recording sheet; pencil

Time Required: 45 minutes to 1 hour

Directions:

1. Introduce the activity by dividing the orange, cookie, brownie, or candy bar into different sized parts so the students can see. Pose the question, "If I give everyone a piece of the _____, will this be an equal way of sharing the _____? Why or why not? How could the _____ be shared equally?" Have students brainstorm and discuss their ideas. (Students should realize that the parts are not equal-sized and thus not an equal way of sharing.)
2. Divide a second orange, cookie, brownie, or candy bar into equal shares using one of the student's strategies for division, and let the students enjoy the treat while you begin the next part of the activity.
3. Next, explain to the students that they will be working with a partner or in a small group to solve the following problem: *There are two children who want to share one orange so that each child gets the same amount. Show how many orange pieces each child can have. Explain your thinking using pictures, numbers, and words.*
4. Discuss the problem with students. Ask, "What are we trying to figure out? How many children are sharing? How many oranges are they sharing? What are some ways we could show our work on this problem?"
5. Set the small groups to work and remind students that they need to draw pictures to show how many parts one child will get if they share the orange equally.
6. Allow students to work on the problem and then explain their thinking.
7. Monitor students as they work to see how they are approaching the problem. What strategies are they using? Are they sharing the oranges equally among the children in the problem? Do their pictures accurately represent equal parts? What difficulties are they having? What are students doing well? How are they recording to show how many orange pieces one child will get?
8. After students have had time to explore the problem, pull the whole class back together to discuss the strategies students used to determine how many orange pieces each child would get if sharing the orange equally. Ask, "How did you solve the problem? How many orange pieces did the children have to share? Did you use the whole orange without throwing any of it away? Did the children get equal parts? How do you know? Is there another way to solve this problem? How did you record your thinking? What numbers did you use to show how much one child will get? Does anyone know what the pieces/parts are called?"
9. Record various students' solutions on chart paper or the board during the whole class discussion. Be sure to discuss the various strategies students used to solve the problem.

Exploration Questions:

- What are we trying to determine with the oranges?
- How many children are sharing?

- How many oranges are they sharing?
- What are some ways you could show your work on this problem?
- How did you solve the problem?
- Did you use the whole orange(s) without throwing any parts away?
- Did each of the children get an equal part? How do you know?
- Is there another way to solve this problem?
- Did anyone have a different picture for your solution?
- How did you record your thinking?
- What numbers did you use to show how much one child will get?
- Does anyone know what the pieces/parts are called?

Variations:

- There are four children who want to share two oranges so that each gets the same amount. Show how many orange pieces one child will get. Explain your thinking using pictures, numbers, and words.
- Use different numbers based on the needs of students.
- Try using numbers that involve each child receiving a whole orange and part of another orange (e.g., four children could be sharing six oranges) to observe strategies students use to solve the problems and share the oranges equally.

Name _____

Sharing

There are two children who want to share one orange so that each gets the same amount. Show how many orange pieces one child can have. Explain your thinking using pictures, numbers, and words.

There are four children who want to share two oranges so that each gets the same amount. Show how many orange parts one child will get. Explain your thinking using pictures, numbers, and words.

Smallest Number

Format: Whole class, small groups, partners

SOL Objectives:
1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
1.2 The student will group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value
1.4 The student will recognize and write numerals 0 through 100.

Related SOL: 1.18, 2.1, 2.2

Vocabulary: *more*, *less*, *counting up*, *counting back*, *number words*, *ten less*, *ten more*, *numerals*, *hundreds chart*

Materials: Cubes; number cards (0–9); 100s chart; recording sheets; pencils

Time Required: 45 minutes to 1 hour

Directions:
1. Begin the activity by having the students compare two numbers, such as 16 and 61. Ask, "How could you build 16 using cubes? How do you know you have the correct amount of cubes to show 16? How could you build 61 using cubes? How do you know you have the correct amount of cubes to show 61? Which number is larger? How do you know? Which number is smaller? How do you know?"
2. After students determine which number is smaller and why, ask them to assess what number would be *ten more*. Students can use materials of their choice (e.g., cubes, 100s chart, 10-frames).
3. Walk around and monitor students' strategies for solving the problem.
4. After they have explored what *ten more* would be, discuss the strategies they used. Ask, "How did you know what number was *ten more*? What did you do to figure this out?" Record student strategies on chart paper/board. Compare the various strategies. Ask, "What is similar? What is different?"
5. Ask students to determine which number would be *ten less*. Students can use materials of their choice (e.g., cubes, 100s chart, 10-frames).
6. Walk around and monitor students' strategies for solving the problem.
7. After they have explored what *ten less* would be, discuss the strategies they used. Ask, "How did you know what number was *ten less*? What did you do to figure this out?" Record student strategies on chart paper/board. Compare the various strategies. Ask, "What is similar? What is different?"
8. Next, have students work with a partner or in small groups. Each group needs a set of number cards.
9. Have each group choose two number cards and record the two numbers they selected on the recording sheet.
10. Students then need to use the two cards they chose to make the smallest two-digit number they can.
11. Have students construct their number using cubes and record a picture of their number.
12. Next, they should write the number word for the number they made.
13. On the recording sheet, have students use pictures, numbers, and words to explain how they know they've made the smallest number they could with the cards selected.

14. Have students construct and write the number that would be *ten more* than the number they have made. Have them record a picture of the number that is *ten more* and write the number on the record sheet.
15. Pull students together as a class to discuss the strategies they used to construct the smallest number from the cards. Ask, "How did you decide which number is *ten more*?"

Exploration Questions:

- How could you build the number _____ using cubes?
- How do you know you used the correct number of cubes to show the number?
- Which number is larger? Smaller? How do you know?
- What is the smallest number you can make with the two cards? How do you know?
- What strategies did you use to figure this out?
- Which number would be *ten more* than the number? How do you know?
- Which number would be *ten less* than the number? How do you know?
- What did your representation of the number look like? How does it relate to the number word that you wrote to tell how many?

Variations:

- Students could use three cards to make the smallest three-digit number from the cards.
- Students could find what number is *20 more*, *20 less*, *15 more*, and *15 less*

Name _____

Smallest Number

Pick two cards and write the numbers you chose on each rectangle below. Then use the cards for the following problems.

Make the smallest two-digit number you can using the number cards. Draw a picture of the number and write the number word for it.

_____
smallest number

Picture of smallest number

_____
number word

How do you know it is the smallest number you can make with the cards?

Draw a picture and write the number that is *ten more* than the number you made with the number cards.

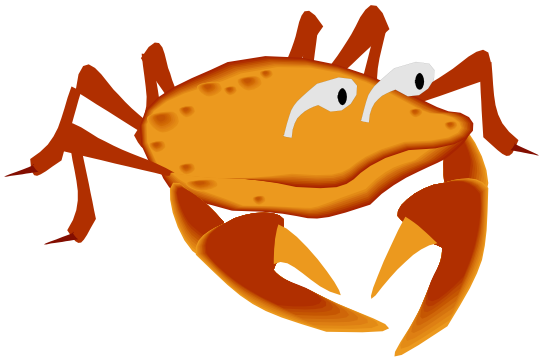
_____

Picture of Number

_____

number word

SECOND GRADE
Number and Number Sense



Comparing Numbers with Base-10 Blocks

Format: Small groups

SOL Objectives:
2.2 The student will compare two whole numbers between 0 and 999, using symbols (>,<,=) and words (greater than, less than, or equal to).
3.3 The student will compare two whole numbers between 0 and 9,999 using symbols (>,<,=) and words (greater than, less than, or equal to).

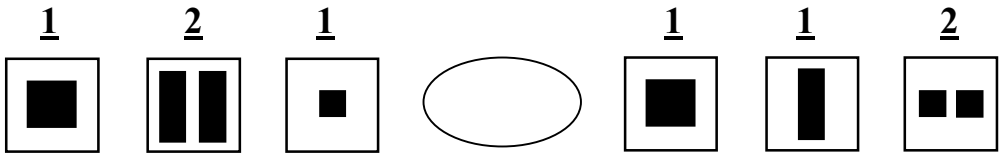
Vocabulary: *greater than, less than, equal to*

Materials: Base-10 blocks; number cards (or number cube) and recording sheet; overhead transparency of the recording sheet

Time Required: Over several days

Directions:
1. Begin by modeling this activity with a student. As Player One, you will draw a number card and record the number in the hundreds place on the overhead recording sheet. Next, build the number using base-10 blocks. The student (Player Two) will do the same.

2. Play continues with the tens and ones place until two three-digit numbers have been built.



3. Ask, "Which number is greater and how do you know?" Review the symbols for *greater than, less than* and *equal to*. Place the correct symbol in the circle, then, with input from the class, develop a written explanation.
4. Repeat the activity and ask, "Which number is less and how do you know?"
5. Remove the base-10 blocks and number from Player Two's side of the recording sheet, and replace with the same base-10 blocks and number as on Player One's side. Ask, "Which number is greater?" Use student responses to reinforce the concept of equality.
6. Divide the class into groups of two. Give each group a recording sheet, base-10 blocks, and number cards.
7. The students will continue this activity as partners.
8. As a closing activity, write a three-digit number on the overhead projector. Each group will build a number that is *greater than, less than,* or *equal to* the number on the overhead projector.
9. As an additional activity, introduce the "Fill-in-the-Blank" game. Have students draw three blank spaces on a sheet of paper to represent a three-digit number. You will generate numbers by using either number cards or a number cube. The object of the game is to create the largest number. When you announce the number, each student must decide which place to record the number. Once the student places the number in a blank, it cannot be moved. Ask, "Who has the largest number? Does anyone have a number greater than ___? How do you know?"

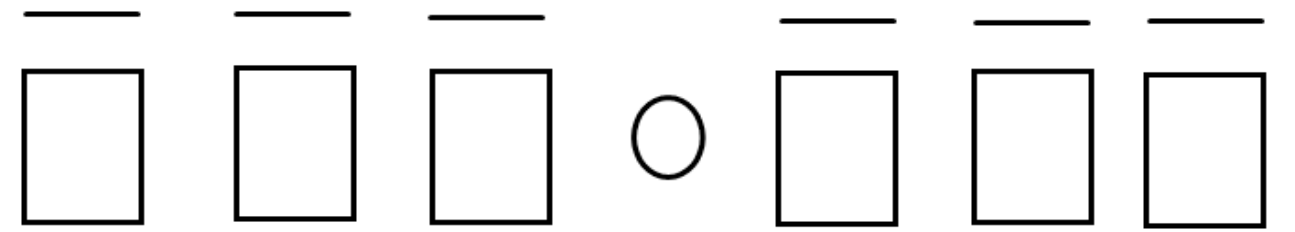
Number Cards

0	1	2	3	4
5	6	7	8	9

0	1	2	3	4
5	6	7	8	9

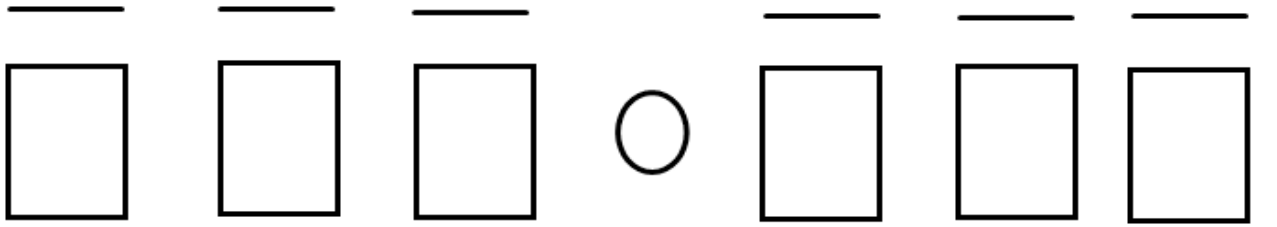
0	1	2	3	4
5	6	7	8	9

Which Number Is Less? How Do You Know?



I know that _____, because

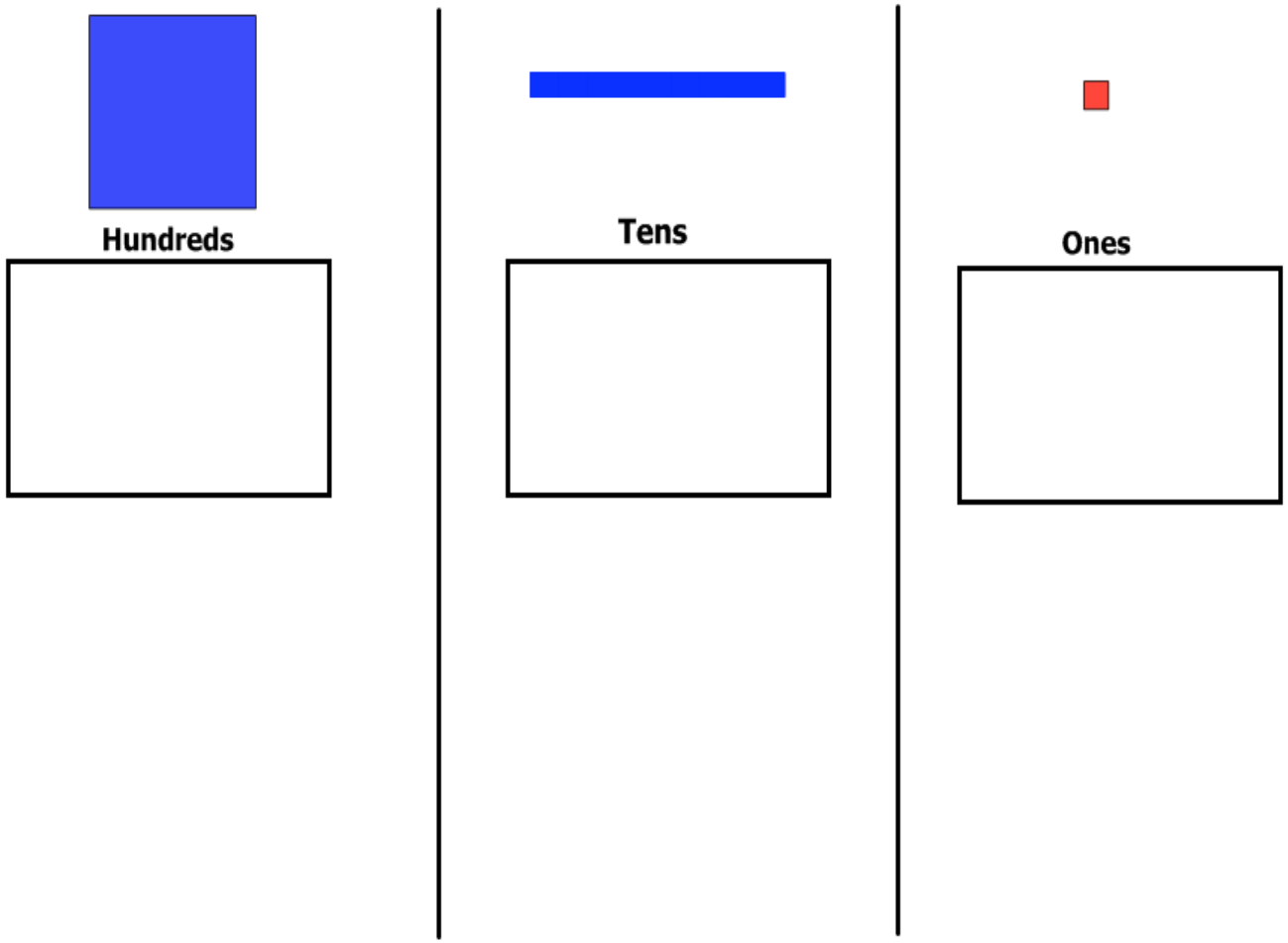
_____.



I know that _____, because

_____.

Base-10 Blocks



Comparing Numbers with Unifix Cubes

Format: Small groups

SOL Objectives:

2.2 The student will compare two whole numbers between 0 and 999, using symbols (>,<,=) and words (*greater than, less than, or equal to).*

3.3 The student will compare two whole numbers between 0 and 9,999 using symbols (>,<,=) and words (*greater than, less than, or equal to*).

Vocabulary: *greater than, less than, equal to*

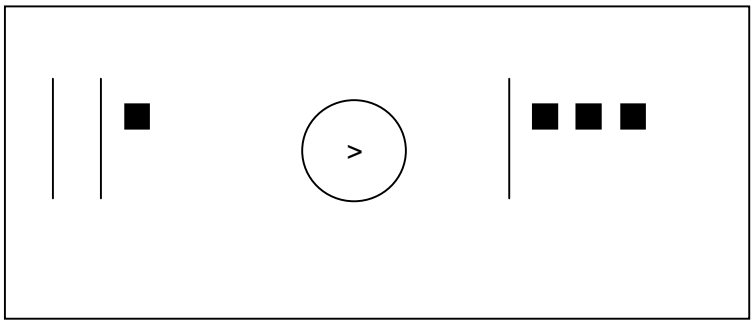
Materials: Unifix cubes

Time Required: Over several days

Directions:

1. To model this activity, place seven Unifix cubes in one circle and two cubes in another circle. Compare the two sets by asking, "Which set has more? How do you know?"
2. Place six Unifix cubes in one circle and three cubes in another circle. Compare the two sets by asking, "Which set has less? How do you know?"
3. Place four Unifix cubes in one circle and four cubes in another circle. Ask questions such as, "Is the number of cubes in circle one greater than in circle two? Is the number of cubes in circle one less than in circle two? How can we compare the two circles?" Discuss the concept of equality.
4. Place nine Unifix cubes in one circle and five cubes in circle two. Ask students to think of ways to compare the Unifix cubes. If no student suggests putting the cubes together to form a tower, then ask, "Could we compare the Unifix cubes if we put the cubes together to make a tower?" Build the towers, then compare the two numbers using the terms *greater than, less than,* or *equal to.* Build several towers using different numbers.
5. Ask, "What if I had two larger numbers, such as 12 and 18? Is there a better way to stack the cubes so that I do not have two tall towers?" Discuss place value and stacking the cubes into groups of tens and ones.
6. Have the students build 12 and 18 by stacking cubes into groups of tens and ones. Using the place value representation, Ask, "Which number is greater/less than? How do you know?" Repeat several times using different numbers.

7. Model building 21 and 13. Ask the students to compare the two numbers. Show them how to represent these two numbers by drawing a picture of 21 and 13, using sticks and dots to represent the tens and ones place.



8. Give the students examples to build and record.

Fractions with Set Models

(Adapted from *Don't Answer the Door!* in the Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml)

Format: Small groups

SOL Objectives:

2.4 The student will identify the part of a set and/or region that represents fractions for one-half, one-third, one-fourth, one-eighth, and one-tenth and write the corresponding fraction.

Related SOL: 1.6, 3.5a

Vocabulary: *One-half*, *one-third*, *one-fourth*, *one-eighth*, *one-tenth*, *equal-sized parts*

Materials: *The Doorbell Rang*, by Pat Hutchins; four copies of the large cookies (cut-out images); student page; cookies (optional); paper; scissors; fraction pieces for projecting on overhead

Time Required: Over several days

Directions:

1. Divide the class into groups of four. Give each student a copy of the student page, and have students cut out each box. Ask for two volunteers to role-play the fraction story (*The Doorbell Rang*) as you read it.
2. Tape the large cookies on the board. Read the first page and discuss how many cookies are in the whole set (12) and how the two students will share them equally (halves). Ask one student in each group to show this with his or her cookies. Then use the large cookies to model it on the board, and write the fractional notation below it. Have the student find that fraction and place it with his or her cookies.
3. Read the next two pages, then stop and have students predict how the characters will solve the dilemma. Ask, "What should they do if more people arrive to share?"
4. Read the next section to see if their predictions were correct. Have students use role-play to mimic what characters do in the story. Continue reading the story, adding more volunteers as needed. Have a different student in each group show the fraction with his or her cookies and then find the correct fraction card. Discuss what is happening to the whole set (i.e., first the cookies get divided into halves, then thirds, and so forth).
5. After finishing the story, discuss what happened to the set of cookies being shared in the story. (The set was divided again and again as more people came.) Discuss the fair shares (equal-sized portions) that each person received. Explain that fractions are shares of a whole or a set. Relate it to how the students would feel if their parents gave them a treat and they had to share it with a brother or sister. The parent would expect them to be fair and divide it equally (fair shares).
6. Ask the students, "What do you notice happening to the fair shares that each person receives as the number on the bottom of the fraction gets larger?" When the set of 12 cookies was divided in half, each child got $\frac{1}{2}$ of 12 cookies or a total of 6 cookies. When the set of 12 cookies was divided in sixths, each child got $\frac{1}{6}$ of the 12 cookies or a total of two cookies. Have students look for the pattern and ask them to think about the patterns they see, talk with their group, and then share as a whole class what they have discovered: the larger the denominator, the smaller the fair share. Compare this with what they know about the region/area model (fraction circles) of fractions. Ask, "Does the conclusion still fit?" Ask students to use the fraction pieces projected on the overhead to justify their conclusions and explain their rationale.

7. As a review and summary of the activity, have students complete a written and pictorial retelling of the fraction story that was shared at the beginning of class. Key components that should be included are the title, author, correct sequence of events, pictorial representations with the fractional notations of what happens each time new people join the original characters, and at least one sentence telling about each picture. Encourage students to use correct capitalization and punctuation.

Variations:

- Students can create their own variations of the fraction story as a dramatic presentation activity. The plays can then be presented to the class, with the fractional parts and fractional notation being drawn on the board, or by having group members present them on posters as props during the presentations.
- Model and create fractions using different set models (e.g., counters, cubes, fruit, six-packs of juice boxes, snack-sized packages of raisins). Set up learning centers so students can rotate and model the fractions, then trace or draw the representations (e.g., if 10 chips is the whole, show $\frac{1}{2}$ by dividing the chips into two equal piles encircling each group with yarn). A pictorial representation of the set model can be made by drawing or by stamping with Bingo markers and then circling the fractional parts.

Large Cookies

Student Page

			
			
			
$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{12}$

Fractions with Pattern Blocks

(Adapted from *Fraction Fish* in the Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml)

Format: Small groups

SOL Objectives:

2.4 The student will identify the part of a set and/or region that represents fractions for one-half, one-third, one-fourth, one-eighth, and one-tenth and write the corresponding fraction.

Related SOL: 1.6, 3.5a

Vocabulary: *One-half, one-third, one-fourth, one-eighth, one-tenth, equal-sized parts*

Materials: Paper; scissors; glue; pattern blocks for teacher and each group; fraction fish and peanut outlines for each student. *(Before the lesson begins, use pattern blocks to create outline of fraction fish and peanut on an overhead projector.)*

Fraction Fish Peanut

Time Required: Over several days

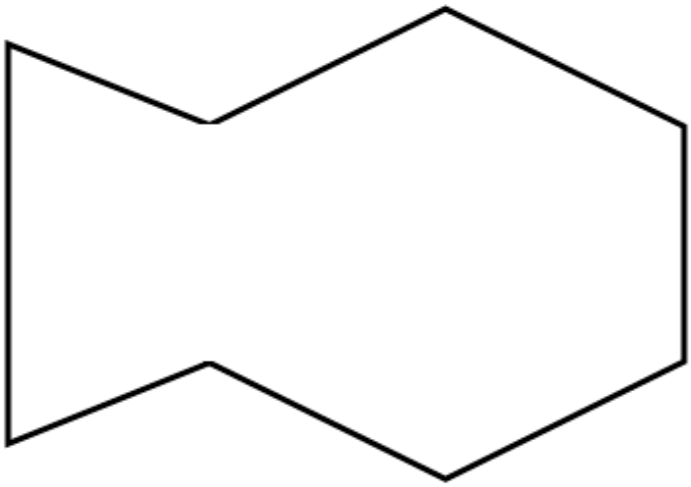
Directions:

1. Group students in fours, placing a set of pattern blocks in the middle of each group.
2. Tell students that you found a picture of a fish (place outline on overhead), and you're curious as to how it was made. Ask them to help you determine how to make the fish using the pattern blocks. Give students a few minutes to come up with different solutions, using whatever strategies they choose.
3. As a class, discuss several of the students' strategies. Have students come up to the overhead and model the different solutions. As each solution is modeled, stick tape to the back of the pattern blocks to recreate the solution on the board, thereby keeping a record of the different solutions. If students use more than one type of pattern block (e.g., two trapezoids and three triangles), accept the answer, but ask if they can now make the fish using only one type of pattern block (e.g., all trapezoids or all triangles). Students will be trading in/making equivalent fractions to achieve this. Only record those solutions that use one type of pattern block (e.g., three trapezoids or nine triangles).
4. Using the patterns stuck on the board, discuss the fractional parts of the fish. Discuss the importance of fair shares, or equal-sized parts, of a whole. Model the fractional notation for each piece. On the overhead, trace the trapezoids inside the fish shape. As you remove each piece, write $\frac{1}{3}$, explaining that the fraction represents one of three equal-sized pieces that make up the fish.
5. Repeat step four using nine triangles.
6. Model the strategy and steps again, as you have the students make the peanut outline shape. Repeat steps two through four.
7. Pass out blank white paper. Have students fold the sheet in half, open it, and draw a line on the fold. Discuss how they started out with one whole sheet of paper and now they have folded it to create

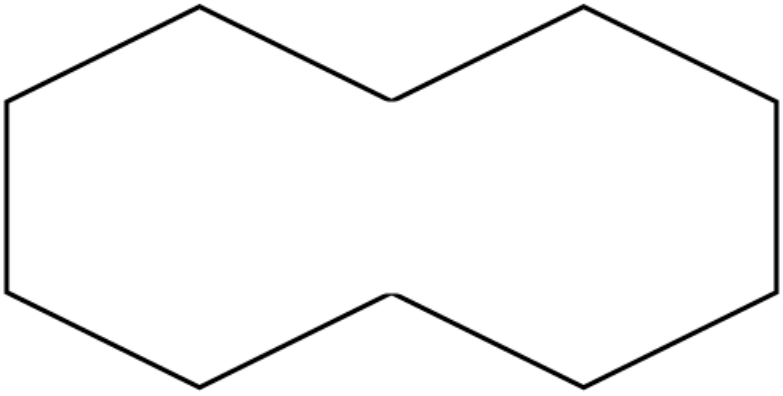
two halves. Draw a pictorial representation on the board and write the fractional notation: one-half and $\frac{1}{2}$ on each half of the paper.

8. Explain to students that they will now create their own picture shapes using two blue rhombuses. They must follow one guideline: the rhombuses must touch on at least one side. Review the geometry terminology of sides. (The step is important to keep the activity a region/area model; otherwise, it could become the set model.) Students should trace the outline of the completed shape, then use the provided sheet of pattern blocks to cut and color the two rhombuses. On the opposite side of their papers, the students should recreate the picture with the paper pattern blocks, writing the fractional notation as they glue each block. Each student will then pass the paper to his or her partner, who will fill in the outline with other equal-sized pattern blocks. The partners will cut, color, and glue their paper pattern blocks on the outline, writing the fractional notation as they remove each piece. (Four green triangles will fit in the shape, so each traced piece should be marked as $\frac{1}{4}$.) When the puzzle is solved, have students pass back their pictures and explain what they did. Allow students to discuss, explain, and verify their solutions.
9. Have students create another shape on the back of their papers using four blue rhombuses. Repeat step eight.
10. Have students share their creations, solutions, and fractional notations.
11. Summarize the lesson by having students explain that the whole can be made up of more than one piece. It does not need to be one hexagon or one fraction circle. Fractions are equal-sized pieces of a whole. Have students quickly identify and write the fractional parts of a whole for $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{10}$.

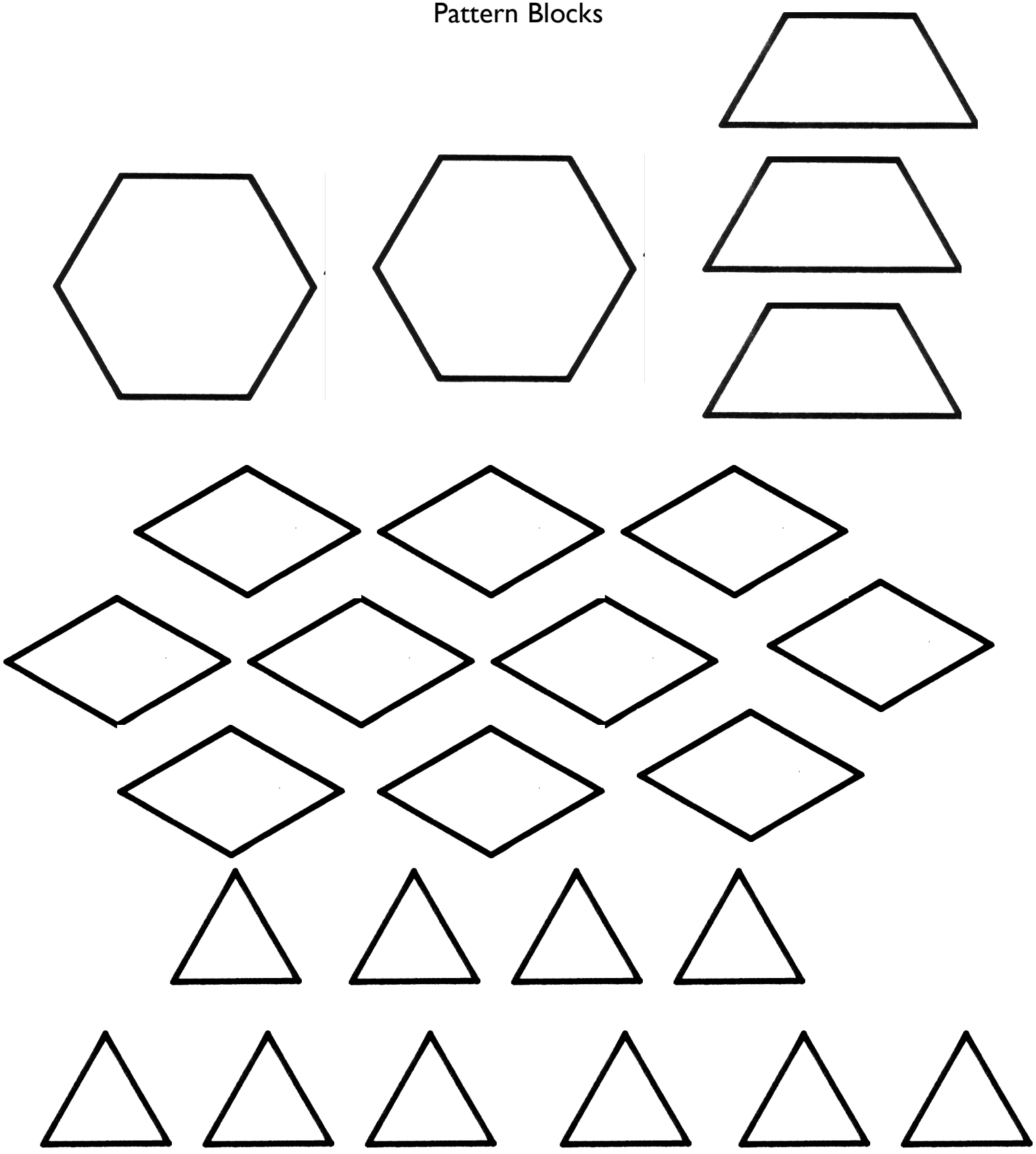
Fraction Fish



Fraction Peanut



Pattern Blocks



Ordinal Numbers: Crab House

Format: Small groups

SOL Objectives:
2.3 The student will identify the ordinal positions first through twentieth, using an ordered set of objects.

Related SOL: 1.5, K.3

Vocabulary: ordinal positions *first* through *twentieth*

Materials: *A House for Hermit Crab*, by Eric Carle; drawing paper and crayons; shell or pattern of a shell to be decorated; items to decorate the shell; cards with ordinal positions first through fifth; Hula-Hoop; paper cups (20); paper crab to hide under the cup

Time Required: Over several days

Directions:
1. Divide the class into 12 groups, giving each group a card with a month of the year listed on it.
2. Before reading the story, *A House for Hermit Crab*, explain to the students that they will need to listen carefully because they will be drawing and recounting the events that happened to the hermit crab during their group's assigned month.
3. Read the book, taking time to discuss with students the events that occurred during each month.
4. After hearing the book read, each group will draw a picture representing the events that happened during their assigned month.
5. Line up the students in the order of their months by asking questions such as, "Which group has the *first* month of the year?" A member of the group should answer in a complete sentence, "I have January, the first month of the year." Continue in this manner until all 12 months have been represented. Emphasize ordinal numbers in the directions.
6. Beginning with January, have a member of each group tell what happened to the hermit crab during the assigned month.
7. After retelling their stories, have all students sit down, except for the students holding the drawings. Have those students sit in a row on the floor.
8. Ask students questions about the story that involve ordinal numbers. The student answering the question should place a Hula-Hoop over the student holding the correct drawing, then orally tell the answer. Examples of questions may include
   - What happened to the hermit crab during the *third* month of the year?
   - Which month is the *tenth* month of the year?
   - During which month did the hermit crab decorate his shell with coral?
   - During which month did the hermit crab and his friends enter the forest of seaweed?
9. When a student answers the question using ordinal numbers, then he/she will take the place of the student holding the drawing. This will ensure that each student will be questioned about ordinal numbers.
10. Either purchase a bag of shells or use the pattern provided as a model for students to decorate their shells. Give each student a card with the ordinal numbers *first* through *fifth* printed on it. Have the students record the order in which each item was attached to the shell. Display the shells and cards.
11. Play the game, "Where's the Crab?" The object of the game is to guess the location of the crab in three or fewer guesses. The person guessing must use an ordinal number in the guess.
    - Have a set of 20 small paper cups or shells turned upside down in a row.

- A student will hide a paper crab under one of the cups.
- Choose a student to guess the position of the crab using an ordinal number. If the guess is incorrect, turn the cup upright to help the students narrow the choices.
- Then the student who hid the crab must give a hint by responding that the crab is either further from the guess or closer to the guess.
- Play continues until the crab is discovered.
- Game variations: The set of cups could be presented in lines or rows from left to right, right to left, top to bottom, or bottom to top.

Additional Resources:

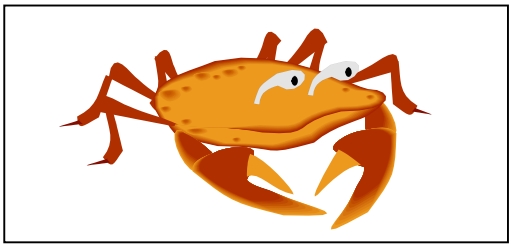
Squigly's Apples
http://www.primarygames.com/squigly/question1.htm

Count Us In
http://www.abc.net.au/countusin/games/game4.htm

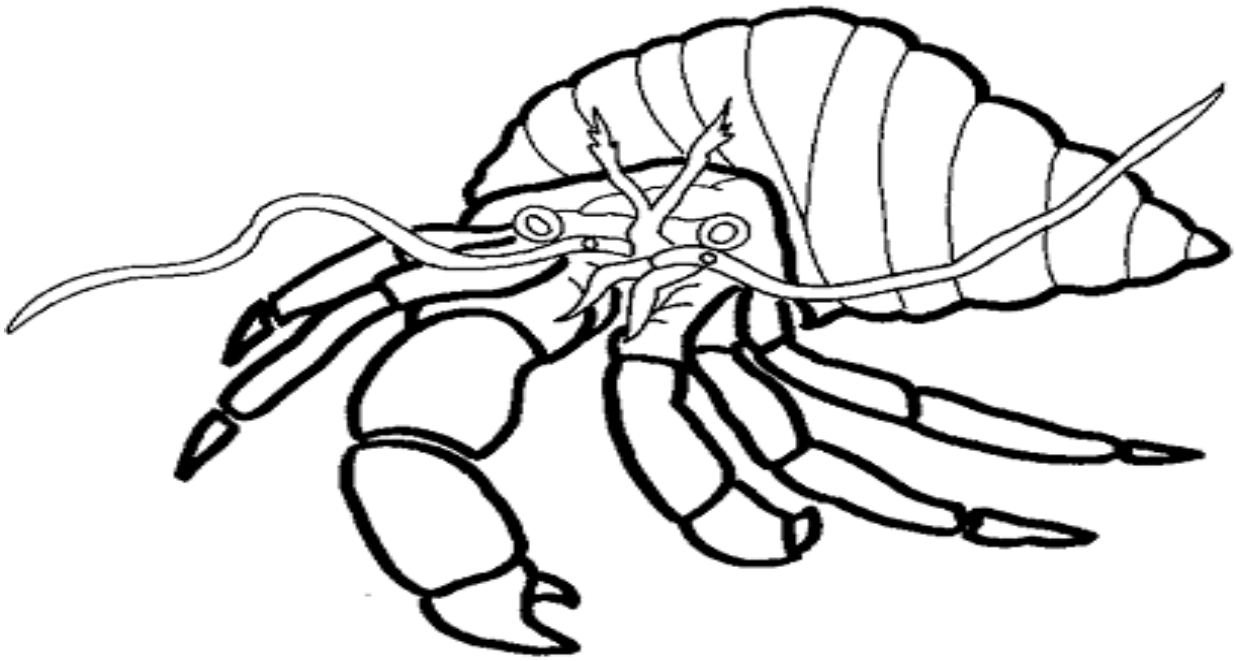
A House for Hermit Crab

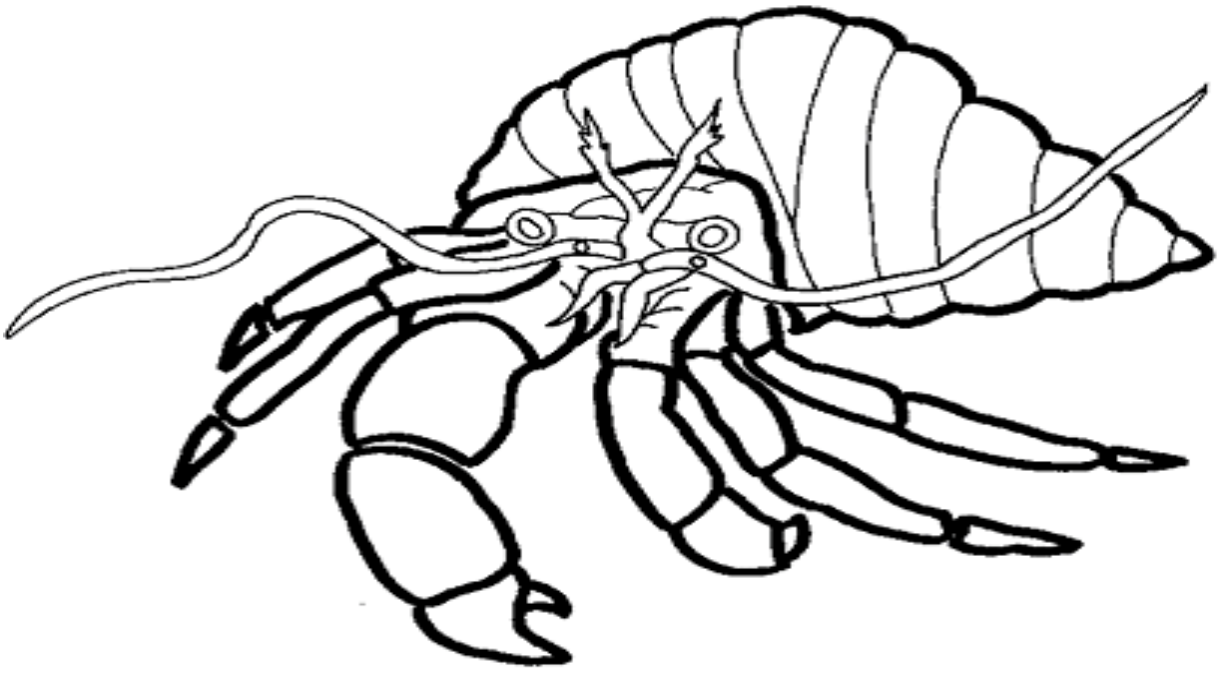
1st	First
2nd	Second
3rd	Third
4th	Fourth
5th	Fifth

A House for Hermit Crab



Crab Pattern





Ordinal Numbers: Just a Little Bit

Format: Small groups, partners

SOL Objectives:
2.3 The student will identify the ordinal positions first through twentieth, using an ordered set of objects.

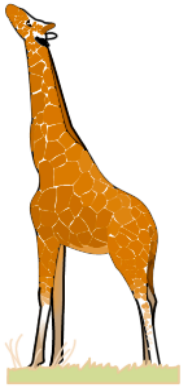
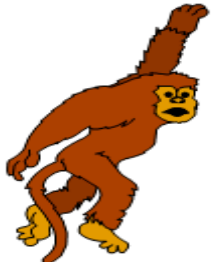
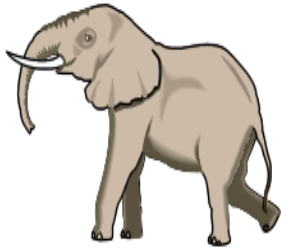
Related SOL: 1.5, K.3

Vocabulary: ordinal positions *first* through *twentieth*

Materials: *Just a Little Bit*, by Ann Tompert; patterns of animals; student cards

Time Required: Over several days

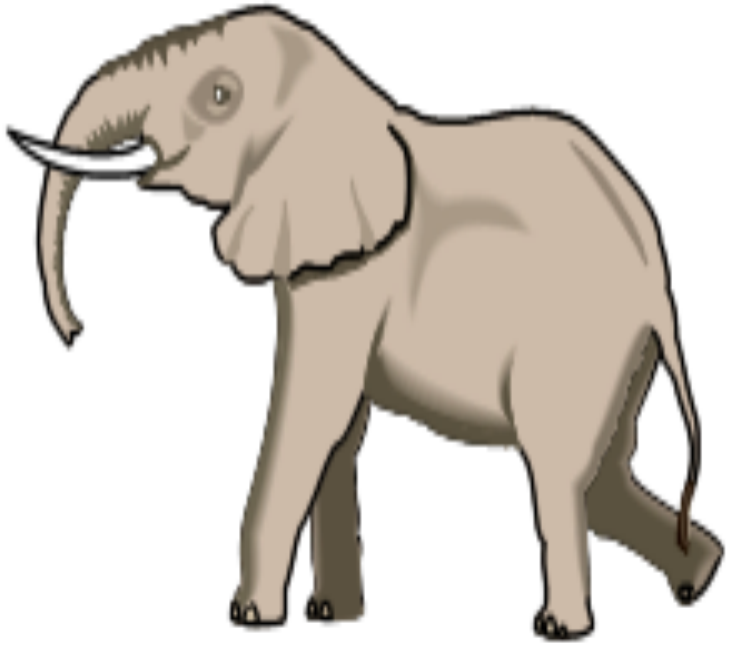
Directions:
1. Read the story to the students and line up the animals as they appear in the story. Identify the ordinal place each animal has in the line.
2. Reinforce the concept of ordinal numbers by asking the students questions, such as "Going from left to right, which animal is third? What position is the zebra?"
3. Divide the students into small groups or partners, and give each group a set of animal cards representing the animals in the story.
4. Have the students order the cards according to the height of the animals, with the shortest animal in the first position, beginning on the right. Check for understanding of the concept by questioning students (e.g., "Going from right to left, in which position is the tallest animal? Which animal is in the eighth position?")
5. Have the students rearrange their cards from top to bottom according to animal weight, with the lightest animal at the top and the heaviest animal at the bottom. Ask questions to check for understanding of ordinal positions.
6. Play the game "Who Am I?" Have the students arrange their animal cards by a predetermined attribute. Secretly choose an animal and give the students clues as to the identity of the animal.
   Example: Attribute–Weight
   Clue 1: It is *not* the first animal.
   Clue 2: It comes after the fourth animal.
   Clue 3: It is lighter than the sixth animal.
7. After playing several rounds of "Who Am I?", have the students write clues for the game.

Just a Little Bit **Student Cards**	Mouse  Height: 2 in Weight: 14 oz	Giraffe  Height: 100 in Weight: 800 lb	Zebra  Height: 60 in Weight: 600 lb	Lion  Height: 54 in Weight: 400 lb	Bear  Height: 48 in Weight: 700 lb
Crocodile  Height: 12 in Weight: 200 lb	Ostrich  Height: 72 in Weight: 300 lb	Monkey  Height: 40 in Weight: 100 lb	Mongoose  Height: 15 in Weight: 25 lb	Beetle  Height: 1 in Weight: 2 oz	Elephant  Height: 84 in Weight: 900 lb

Just a Little Bit

Patterns

Elephant



Height: 84 in
Weight: 900 lb

Ostrich

Height: 72 in
Weight: 300 lb

Zebra

Height: 60 in
Weight: 600 lb

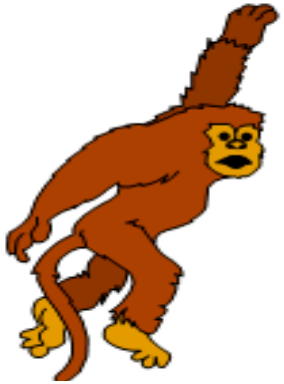
Lion

Height: 54 in
Weight: 400 lb

Bear

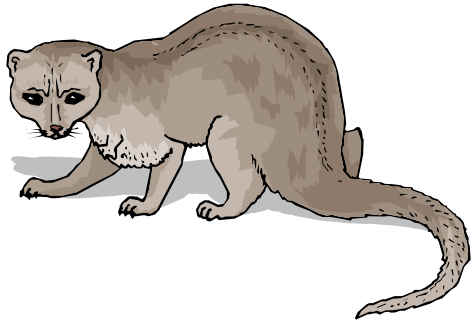
Height: 48 in
Weight: 700 lb

Monkey



Height: 40 in
Weight: 100 lb

Mongoose



Height: 15 in
Weight: 25 lb

Crocodile

Height: 12 in
Weight: 200 lb

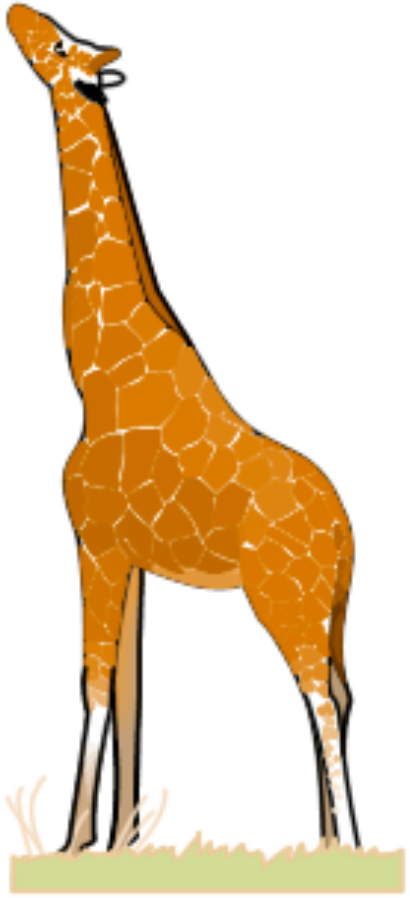
Mouse

Height: 2 in
Weight: 14 oz

Beetle

Height: 1 in
Weight: 2 oz

Giraffe



Height: 100 in
Weight: 800 lb

Ordinal Numbers

(Adapted from *Ordinals* in the Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml)

Format: Small groups

SOL Objectives:

2.3 The student will identify the ordinal positions first through twentieth, using an ordered set of objects.

Related SOL: 1.5, K.3

Vocabulary: Ordinal positions *first* through *twentieth*

Materials: Overhead projector, transparency, and dry-erase marker; colored counters (at least six); sets of 20 objects; ordinal numbers written on self-adhesive notes

Time Required: Over several days

Directions:

1. Have students do some activities in which there will be a first, second, and third place. For example, have the entire class line up and count off using ordinal terminology. It may be necessary for you to begin by saying, "I am first," so that students understand the process. Have a group of six students run a short race, and have the others say who finished first, second, and third. Using small toy cars and a predetermined raceway, allow six students to race the cars and determine which one finished first, second, and third. Take an ordinal field trip: Take your class into the hall and send an individual or pair of students to the third door on the right. Send two others to the second door to the left. Be sure that each student participates in at least one of the activities.
2. Ask students what all of these activities have in common. Explain that today they will be talking about numbers that indicate a position in a series or order. Ask the students to explain how ordinals were used in each activity earlier.
3. Select 20 items from around the room and place them in a row. Pass out self-adhesive notes with ordinal numbers written on them. Select students to come up and label the items by placing the notes on the actual items so that the entire class can see. Once one direction has been started (e.g., left to right), make sure students follow that same order. Then remove the ordinal notes, pass them out again, and have students label the positions of the items but in the opposite direction (right to left).
4. Place six colored counters on an overhead transparency. Arrange the counters horizontally. Have students come up and label the ordinal positions from left to right using a dry-erase marker. Ask them to predict what would happen if you turned the transparency from horizontal to vertical. Then turn the transparency clockwise and have students discuss what has changed and what has not changed. Students should realize that the ordinal position has not changed as long as you are going from bottom to top. Erase the ordinal positions. Ask other students to come up to the overhead and label the six counters with ordinals from top to bottom. Ask them to predict what will happen when you change it back to a horizontal orientation (counter-clockwise). Change it back to a horizontal orientation and have them discuss what has changed or what has not changed.
5. Place students in groups of four to six. Have one student from each group select 20 items from around the room to bring back to the group. Each student in the group will draw a pictorial representation of those 20 items and label the pictured objects with ordinal numbers. They will then add a written explanation of what will happen if the orientation changes from horizontal to vertical.

Allow the students to physically change their vantage point (get up and move so that the row becomes a column) and then write their explanations. If students need further guidance, refer to the rotation of the counters on the overhead transparency.

6. When the class period is almost over, regroup as a whole class and review what students did that day. Have students share their pictorial representations and written explanations.

Variations:

- Have students draw all students in class in a line going from the classroom door to the teacher desk. Have them choose and denote their place in line using an ordinal number. Have them explain their rationale for picking that location. Ask if their preferred place would change depending on the activity (e.g., getting ready to go outside or having the teacher check your work before going to learning centers). Ask, "Would you choose to be in a different spot if the order was always going to be the same?"
- Have students write in their journals about real-life applications of ordinals.
- Have students explain how sports would be different in a world without ordinals.
- Have students try to write directions for how to make an art project or how to solve a problem that requires sequencing—without using ordinals. Then have the students write the directions using ordinals. Discuss the impact, and have students explain why ordinals were invented.
- Have students ask an adult family member for directions to his or her house and tally the number of ordinals that are used in the explanation.
- Have students create a collage of pictures (using their own drawings or images cut from magazines and newspapers) of instances where ordinals are used (e.g., calendar, sports, floors of buildings, rooms in long hallways).

Rounding with Base-10 Blocks

Format: Small groups, partners

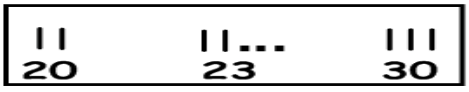
SOL Objectives:
2.1 The student will
b) round two-digit numbers to the nearest ten.

Related SOL: 3.2, 4.1c

Vocabulary: *rounding*

Materials: Base-10 blocks; T-chart; overhead projector

Directions:
1. Using Base-10 blocks, model the concept of rounding. First, build the number 23. Next, have the students identify the ten that comes before 23, or the smaller ten, and represent it with the Base-10 blocks.
2. Have students identify the ten that comes after 23, or the larger ten. Show students how that ten is represented using the Base-10 blocks.



3. Working with a partner, or in a small group, ask the students to decide if 23 is closer to 20 or 30. Have the groups share their answers and explain the reasoning.
4. Explain why 23 is closer to 20 than to 30. For example, you could compare the difference between 20 and 23, and 23 and 30 to show that 23 is closer to 20.
5. Record 23 on a T-chart with the categories "Smaller Ten" and "Larger Ten" labeled.

Smaller Ten	Larger Ten
23	46
51	68

6. Model another example of rounding with Base-10 blocks using the number 46.
7. Choose numbers to be rounded to the nearest ten and have the students use the Base-10 blocks to round the number, following steps one and two above.
8. Continue to record the numbers on the T-chart until all digits are represented in the ones place except five.
9. The students will use the numbers on the T-chart to look for similarities and differences in order to identify the pattern used to round numbers.
10. Have each group write a response to "How to Round a Number" and share with the class. The class will test each group's method for accuracy.
11. Ask, "What about a number with a 5 in the ones place?" After student discussion, tell the students that any number with a 5 in the ones place belongs in the larger group.
12. Give each group the opportunity to revise its version of "How to Round a Number." Post accurate methods in the classroom.

Smaller Ten	Larger Ten

Rounding with Number Lines

Format: Small groups

SOL Objectives:
2.1 The student will
b) round two-digit numbers to the nearest ten.

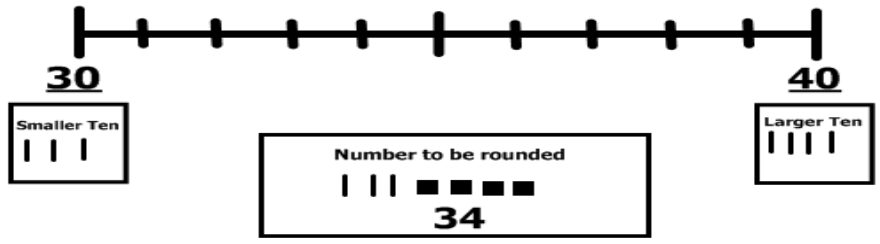
Related SOL: 3.2, 4.1c

Vocabulary: *rounding*

Materials: Base-10 blocks; overhead projector; blank number lines; colored pencils or crayons

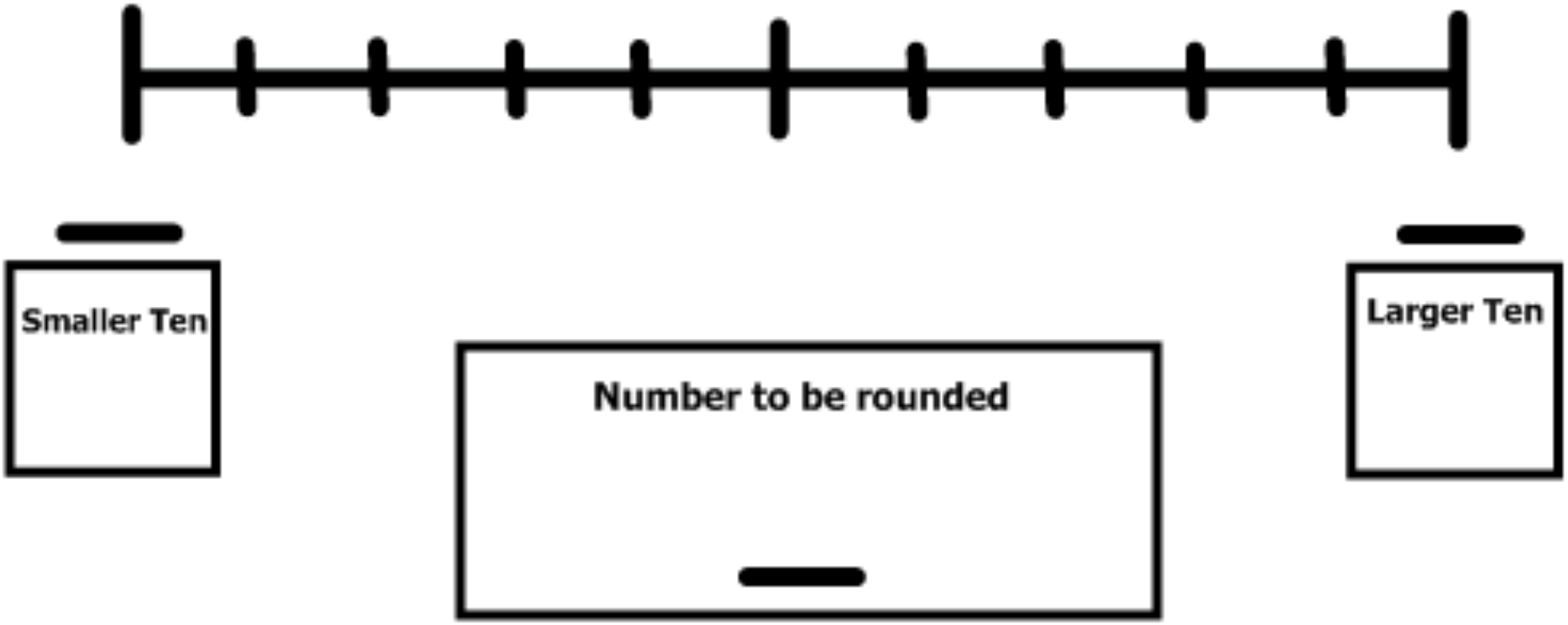
Time Required: Over several days

Directions:
1. To review rounding using Base-10 blocks, you should model an example from the previous lesson.

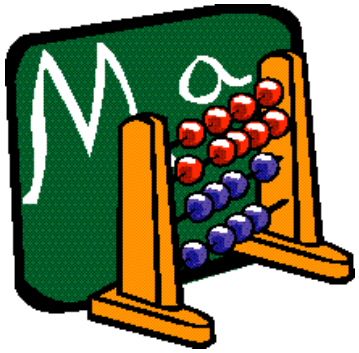


2. Ask, "What could we do if we did not have Base-10 blocks to help us round numbers?" Have students share their ideas and discuss the advantages and disadvantages of the different strategies.
3. Use the strategy of drawing Base-10 blocks to assist with rounding. For example, demonstrate how to draw Base-10 blocks to illustrate 34. Next, have students identify the smaller ten and larger ten, as you illustrate.
4. Introduce the idea of using a number line to help with rounding numbers.
5. Using the example of "Round 34 to the nearest ten," first, draw Base-10 blocks to represent 34, then write the numeral. Identify the smaller ten and larger ten. Represent those values with Base-10 blocks and write the numbers. Then, locate 34 on the number line. Using a colored pencil or crayon, begin at 34 and draw an arc to 30. Then, using a different colored pencil or crayon, begin at 34 and draw an arc to 40. Have the students compare the difference to understand that 34 is closer to 30 than to 40.
6. Give each student a blank number line and have the students work through several examples as you model the technique on the overhead.
7. Introduce students to the "Heads Together Rounding" activity.
8. Divide the class into groups of four, and assign a letter to each group (e.g., group A, group B).
9. Groups will record their letter on a sheet of paper, then decide who within their group will be number 1, 2, 3, and 4. Have each group post its recording sheet on the wall.
10. Choose a number to be rounded to the nearest ten. The groups should "put their heads together" to reach consensus on the answer. Each group member must understand the correct answer.
11. Randomly pick a number (1–4) and only that member of each group may go to their group's sheet and record the answer.
12. After all answers have been recorded, review the questions with students.

Number Line



THIRD GRADE
Number and Number Sense



Abacus Action

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.2 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1c

Vocabulary: *ones, tens, hundreds, thousands, ten thousands, hundred thousands, place value, rounding, whole number, digits, period*

Materials: *The Warlord's Beads*, by Virginia Walton Pilegard; wooden board with nails and beads to serve as abacus

Time Required: 45 minutes to 1 hour

Directions:
1. Read *The Warlord's Beads* to the class. Tell students that they will be using an abacus similar to the one that Chaun created. Explain that an abacus is a tool they will use for counting, building, reading, and writing numbers.
2. Give each student a wooden base and a set of beads. Allow time for the students to experiment with placing beads on the nails. Ask, "How many beads fit on any one nail?" *(9)*
3. Ask the students to put a finger on the ones place (first nail on the left). Check for understanding before moving on. Do the same for the tens, hundreds, thousands, ten thousands, and hundred thousands places.
4. Begin building numbers on the abacus. Place five beads in the ones place and ask students to do the same. Ask them to read the number and then write the number on individual white boards or paper. Continue with other (larger) numbers until the students are comfortable with using the abacus to represent any number up to 999,999. As you build different numbers, ask students to identify digits (and their values) in particular place value positions.
5. Have students build numbers given clues such as the following:
   Example 1
   - This number has a 6 in the tens place.
   - The digit in the ones place is two more than the digit in the tens place.
   - The digit in the hundreds place is an odd number greater than 7. *(968)*

   Example 2
   - This number is more than 51,000 but less than 52,000.
   - The digit in the hundreds place is the sum of 4 and 5.
   - The tens place is worth 80.
   - The digit in the ones place is an even number more than 7. *(51,988)*
6. Practice rounding numbers by having students build a given number on the abacus and then round that number to the nearest ten, hundred, or thousand. Have students use the physical model to explain the rounding process.

Exploration Questions:

- What is the value of a digit in a particular place?
- What happens when there are no beads in a given place? How would you write that number? (Be sure students are including the zero in the number.)
- Have students show 2,049. What happens when you add 3?
- What are different ways to read and write 41 (e.g., 4 tens and 1 one or 41 ones)?
- Given the number 473, is this the largest number you can make with these digits? Can you make a smaller number? What is this number in expanded form?

Build the Number

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.2 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1c

Vocabulary: *ones*, *tens*, *hundreds*, *thousands*, *ten thousands*, *hundred thousands*, *place value*, *rounding*, *digit*, *whole number*, *period*

Materials: Place-value mat and cards 0–9 (which can be found in Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml, pages 4 & 6); overhead projector; overhead transparency with number word written on it, white boards or paper for each student

Time Required: 45 minutes to 1 hour

Directions:
1. Introduce activity by reviewing place-value mat and the terms of each period (i.e., ones, tens, hundreds).
2. Write a number word (e.g., three hundred fifty-two) on the overhead transparency.
3. Students should use their cards to show the numerical value of the number word.
4. Circulate around the room, monitoring student answers.
5. After giving students several examples, increase number values to include numbers up to the hundred thousands place. For example, have students write "nine hundred forty-five thousand, sixty-one."
6. You may substitute place-value mat and cards 0–9 with place value cards.

Exploration Questions:
- What happens when there is not a number written for the hundreds place? How do you write that? Give the example, "nine hundred forty-five thousand, sixty-one" (945,061). Remind students that they will put a zero in the hundreds place to represent no hundreds in this number.

Variations:
- Refer to the "*Build the Bigger Number"* activity in the Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml.
- Build a bigger number.
- Build the smallest number.

People Fractions

Format: Whole class

SOL Objectives:

3.5 The student will divide regions and sets to represent a fraction; and name and write fractions represented by a given model (area/region, length/measurement, and set). Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths.

Related SOL: 1.6, 2.4, 4.2, 5.2a

Vocabulary: *halves*, *thirds*, *fourths*, *fifths*, *sixths*, *eighths*, *tenths*

Materials: *Five Creatures*, by Emily Jenkins, Tomasz Bogacki, and Tomek Bogacki; two construction paper squares; scissors

Time Required: 20 to 30 minutes

Directions:

1. Read *Five Creatures* to the class. Relate the family in the story to fractions, using the five creatures in the house as a set model for a whole. Ask, "What fraction of the creatures in the house likes to eat mice?"
2. Ask for six volunteers to go to the front of the room to serve as a whole group. Ask the students to find fractions that politely describe parts of the whole group (e.g., two-sixths of the students are wearing tennis shoes). When appropriate, show reduced fractions by having students group themselves accordingly. For example, if two-sixths of the students have tennis shoes, ask students to arrange their groupings to demonstrate that one-third of the students are wearing tennis shoes (e.g., have all the students pair up to show three groups within the whole). Repeat this activity, allowing students to model and identify other fractions within the group.
3. Show the class two squares. Ask the students to describe the squares, making sure that they recognize that the squares are congruent. Cut one square in half vertically and the other square in half on the diagonal. Tell students to imagine the squares are granola bars. Ask, "Which piece would you like to have?" Discuss students' answers.

Picture Parts

Format: Whole class

SOL Objectives:

3.5 Divide regions and sets to represent a fraction; and name and write the fractions represented by a given model (area/region, length/measurement, and set). Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths.

3.6 Compare the numerical value of two fractions having like and unlike denominators, using concrete or pictorial models involving areas/regions, lengths/measurements, and sets.

Related SOL: 1.6, 2.4, 4.2, 4.3, 5.2

Vocabulary: *Fraction*, *halves*, *thirds*, *fourths*, *eighths*, *tenths*,

Materials: *Picture Pie, A Circle Drawing Book*, by Ed Emberley; glue, scissors, construction paper; construction paper pattern blocks (see *Something Fishy* lesson in the Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml). You can draw a line perpendicular to the bases on the trapezoids to create two equal-sized smaller pieces, so that you also have fourths when the hexagon is a whole. Use a different color for that page.)

Time Required: 45 minutes to 1 hour

Directions:

1. Read *Picture Pie, A Circle Drawing Book* to the students.
2. Have students discuss the different parts of the whole when the circle is the whole.
3. Next, give each student a set of construction paper pattern blocks.
4. Tell the students that the hexagon is a whole. Ask them to hold up the piece or pieces that are equal to one-half.
5. Ask if they see more than one solution. Ask them to hold up the piece or pieces that are equal to one-third, one-fourth, and one-eighth, if possible.
6. Next, tell the students that the trapezoid is the whole. Again, they should hold up the piece or pieces that are equal to one-half, one-third, two-thirds, and so forth. Ask, "What is the trapezoid equal to?"
7. Change the whole to the triangle and repeat the steps above.
8. After discussing the different parts, have students create a picture using 15 or fewer pattern blocks.
9. Ask students to consider that if the hexagon is the whole, how many halves do they have, how many thirds, how many fourths? (They can use the back of their paper to answer the questions.)

Variations:

- When the students hold up the different pieces to show halves, ask the student who is holding up three triangles, "What fraction is that?" Another student may be holding up the two equal pieces that make the trapezoid; ask that student if he or she can identify two-fourths and three-sixths.

Place Value Sense

Format: Whole class, partners

SOL Objectives:
3.7 The student will read and write decimals expressed as tenths and hundredths, using concrete materials and models.

Related SOL: 4.4, 5.1

Vocabulary: *tenths*, *hundredths*

Materials: Models of ones, tenths, and hundredths, using 10 x 10 squares

Time Required: 20 to 30 minutes

Directions:
Students should have seen several models of tenths and hundredths prior to this lesson.
1. Divide students into pairs.
2. Write a number on the board, such as 0.56.
3. Ask the students to say the number to a partner.
4. Have one student say it out loud.
5. Then write another number, such as 5.6.
6. Ask students to say the number to a partner. Ask, "What has changed? Which number is bigger?"
7. Ask students to draw a picture of the two numbers using blank 10 x 10 squares.
8. Say another number to the class, such as 2.37.
9. Ask the students to write the number on paper and then compare it with what their partners wrote. Have one of the students write the number on the board.
10. Ask students to draw a picture of the number.
11. Ask them to write a number that is one-tenth larger. Ask, "What is that number?"
12. Ask students to write a number that is one-hundredth smaller. Ask, "What is that number?"
13. Have students say the number to their partners, and then draw a picture of it.
14. Next, ask them to write 0.49 in as many different ways as they can. For example, 0.1 + 0.1 + 0.1 + 0.1 + 0.09 or 0.4 + 0.09, or 4 tenths and 9 hundredths. Have them write all of these ideas on the board.

Yes or No, What's My Number?

Format: Whole class

SOL Objectives:

3.3 The student will compare two whole numbers between 0 and 9,999, using symbols (>, <, or =) and words (*greater than, less than,* or *equal to).*

Related SOL: 2.2, 4.1, 5.1

Vocabulary: *greater than*, *less than* or *equal*

Materials: A sticker for each student with a number on it between 0 and 9,999

Time Required: 30 to 45 minutes

Directions:

1. Put a number between 0 and 9,999 on the back of each student's shirt, using a sticker. Have students walk around the room and ask a classmate one question: "Is my number greater than, less than, or equal to number _____?" Students will need to continue walking around the room and asking other classmates the question (varying the number) until determining the number on the sticker. Students have the option of carrying a folder or clipboard with a piece of paper to write down their questions, and answers received. Check to see their notations.
2. When a student deduces his/her number, he/she can move the sticker to the front of his/her shirt. She/he can continue to answer questions for other students who have not figured out their numbers. Play continues until everyone knows their numbers.
3. Next, ask the students to line up around the room from least to greatest, based on their numbers.
4. At the end of the lesson, ask the students to explain their methods for eliminating choices and arriving at their numbers. Did they have a strategy?

Variations:

- Check to see what types of notations the students are using on their papers as they circulate. If they use words, ask if they can use symbols; if they use symbols, ask if they can put their notation in words.
- Evaluate the questions that they ask. Are they just guessing, or are they using some type of strategy to eliminate certain choices?
- Have the students share their ideas as a group.

100s Chart Activities

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.8 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1c

Vocabulary: *ones*, *tens*, *hundreds*, *thousands*, *ten thousands*, *hundred thousands*, *place value*, *rounding*, *digit*, *whole number*, *period*, *product*, *one more*, *ten more*, *one less*, *ten less, descending order*

Materials: 100s charts: (1 to 100 board and 0 to 99 board); counters for 100s chart

Time Required: 45 minutes

Directions:
1. Give each student a 100s chart and a counter.
2. Practice by having students put a counter (or a finger) on a number on the 100s chart (34, for example). Tell them to add 10. Ask, "What is the sum?" *(44)* Make sure students understand that adding 10 to 34 requires moving down one space on the 100s chart. *(Students usually will learn that they just need to move down one space when adding 10, instead of counting one by one.)*
3. Try another example *(56)*. Ask students to add 10 *(66)*. Again, students should move their counters down one space on the 100s chart. Do as many examples as necessary until all students can successfully complete the task.
4. Next, have students place a counter on 72, and then subtract 10. Tell students to note that their counters move up one space because they are subtracting, not adding. Practice several subtraction examples.
5. Try adding 11. Tell students to place a counter on 24, and then add 11. Students should move finger down one space to make 10 and then one space to the right, indicating that 11 is the same as 10 + 1. Try more examples until students grasp the concept.
6. Move to a subtraction example. Ask students to put a counter on 89, and then subtract 11. Students should move up one space to represent minus 10, and then move one to the left to subtract 1, arriving at the answer of 78.
7. Students should now be ready to play the following games. As you play each game, you'll see students getting faster at adding and subtracting once they understand how to manipulate (decompose numbers on) the 100s chart.

Game One

Directions:

1. Tell students that you're thinking of a number on the 100s chart. Offer clues to help students identify the number.
2. Ask students to place their counters on the *sum* of 11 and 7. Have them check with a neighbor to make sure everyone is starting on the same number *(18)*.
3. Add 20. *(Monitor students to check if they move their counters down two spaces to add 20, arriving at the sum of 38.)*
4. Subtract 2. Ask, "Where are you now? Are you on a multiple of 6?"
5. Subtract 10, and then subtract 1. Ask, "Is your number the same as the number of pennies in a quarter?" *(yes, 25)*
6. Add 9. *(You may notice students adding 10 and then subtracting 1.)*
7. Add 11. Ask, "Are you on a *multiple* of 5?" *(yes, 45)*
8. Subtract 2, and add 21. Ask, "Is the *sum* of the digits 10?" *(yes, 64)*
9. Add 31, and then subtract 10.
10. Add 1, and then subtract 20. Ask, "Are both *digits* the same?" *(yes)*
11. Ask students: "What's my number?" *(66)*

Game Two

Directions:

1. Instruct students to place a counter on the *product* of 11 and 7. Have them check with a neighbor to make sure everyone is starting on the same number *(77)*.
2. Add 20, and then subtract 2. Ask, "Are you on a *multiple* of 5?" *(yes, 95)*
3. Subtract 10, and then subtract 1. Ask, "Is the tens place *double* the ones place?" *(yes, 84)*
4. Add 9, and then subtract 30. Ask, "Is the number a *multiple* of 3?" *(yes, 63)*
5. Subtract 2, and then add 21. Ask, "Is the *sum* of the digits 10?" *(yes, 82)*
6. Subtract 31 and add 10.
7. Add 1 and then subtract 18. Ask, "Are both *digits* the same?" *(yes)*
8. Ask, "What's my number?" *(44)*

Game Three

Directions:

1. Instruct students to place a counter on the *product* of 5 and 7. (Ask students to answer aloud, so that everyone starts on the same number, 35).
2. Subtract 3. Add 11. Ask, "Are the digits in consecutive *descending order*?" *(yes, 43)*
3. Add 12, and then add 9.
4. Subtract 1. Ask, "Is the tens place double the ones place?" *(yes, 63)*
5. Subtract 9, and then add 1.
6. Add 20. Ask, "Is this the amount of change you would get from $1, after making a 25-cent purchase? *(yes, 75 cents)*
7. Subtract 3, and then add 9. Ask, "Is this number a *multiple* of 9?" *(yes, 81)*
8. Subtract 29. Ask, "Is the *sum* of the digits 7?" *(yes)*
9. Ask, "What's my number?" *(52)*

Exploration Questions:

- What happens to a number when you go up one space? *(increases by 10)*
- What happens to a number when you go down one space? *(decreases by 10)*
- How can you write 11? *(10 + 1)* How do you show that number on the 100s chart? *(move up one and over one)*
- What other patterns did you notice when using the chart?

Variations:

- Use a 200s chart
- Refer to *Nimble With Numbers: Engaging Math Experiences to Enhance Number Sense and Promote Practice*, by Leigh Childs, Laura Choate, Karen Kenkins.

Place Value Hula Hoop Race

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.7 The student will read and write decimals expressed as tenths and hundredths, using concrete materials and models.

Related SOL: 4.4, 5.1

Vocabulary: *ones*, *tens*, *hundreds*, *thousands*, *ten thousands*, *hundred thousands*, *place value*, *whole number*, *digits*, *period*

Materials: Number cards (15 to 20 cards written numerically and 15 to 20 cards written with word names); two Hula Hoops

Time Required: 20 minutes

Directions:
1. Place Hula Hoops on the floor on one side of the room.
2. Spread half of the numeric cards and their corresponding word name cards in one hoop. Place second set in the other hoop.
3. Divide students into two teams lined up at the opposite end of the classroom from the Hula Hoops.
4. On your signal, the first student in each line races down to the Hula Hoops and finds a set of matching cards (one number card and its corresponding word name card). The students race back with the cards and place them on the floor near their line.
5. Quickly check to see if the card set is correctly matched. If it is, allow the next student in line to go. If it's not correct, quickly place the card set back in the Hula Hoop, as you signal the next student in that line to go.
6. Play continues until one team's Hula Hoop is empty, and the team has successfully matched all of its numeric cards with the corresponding word name cards.

Variations:
- Use decimal number cards and decimal word name cards. For example, write 2.61 on one card and two and sixty-one hundredths on a corresponding card.

Sample Number Cards

135	**One hundred thirty-five**
204	**Two hundred four**
35	**Thirty-five**
44,651	**Forty-four thousand, six hundred fifty-one**
12,044	**Twelve thousand, forty-four**
990	**Nine hundred ninety**
635,002	**Six hundred thirty-five thousand, two**
18,405	**Eighteen thousand, four hundred five**
62,091	**Sixty-two thousand, ninety-one**
18	**Eighteen**

Place Value Paths

Format: Whole class or small group

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.

Related SOL: 2.1, 4.1, 5.1

Vocabulary: *more than*, *less than*, *add*, *sum*, *subtract*, *difference*, *ones*, *tens*, *digits*, *double*, *multiple of*

Materials: 100s chart; two sets of digit cards; place-value paths recording sheet for each student

Time Required: 30 to 45 minutes

Directions:
1. Mix the two sets of digit cards together and stack them facedown.
2. Draw two cards and announce the digits to the class. Ask, "What numbers can be formed using these digits?" *(Example: 5 and 6 are drawn, thus the number choices are 56 and 65.)*
3. Each player selects one of the digits. Remind students that their place-value paths ultimately must contain six two-digit numbers, ordered from smallest to greatest. The six two-digit numbers need to touch. After six numbers, continue drawing numbers to reach both ends of chart.
4. Instruct students to independently record their number choices in one of the cells along the place-value path. If students cannot place either of the possible numbers in any of their remaining cells, nothing is recorded.
5. After six draws, ask whether any students have completed their entire place-value path. Draws continue until the majority of students have completed paths. Ask the students to compare their results.

Exploration Questions:
- How did you decide where to place your numbers?
- How do your paths differ from others in class?

Variations:
- Use three cards per draw.
- Use a 200s chart.

Place Value Roll

Format: Pairs or small groups

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.8 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1b

Vocabulary: *ones*, *tens*, *place value*, *digit*, *whole number*, *period*, *adding*, *subtracting*, *sum*, *difference*

Materials: Place-value roll chart (100s chart, 99 chart, or 200s chart); number cubes; cover disks

Time Required: 20 minutes

Directions:
1. Instruct the starting player to roll the number cubes and add the numbers on the top faces. Students should then cover that number on the chart. *(Example: If one cube is 3, and the other cube is 4, students would then cover the number 7.)*
2. The next player rolls the number cubes, and the process repeats.
3. On the starting player's second turn, he or she rolls the number cubes and adds the total to the sum rolled on the first turn. (To score totals greater than 10, the player can use two number cubes.)
4. Have players alternate turns until one player reaches 99 or higher.

Exploration Questions:
- What methods did you use to add? *(add on, double, estimate, paper and pencil)*
- How could you check your answers? *(paper and pencil, calculator, subtraction)*

Variations:
- Give each pair a calculator to check answers in the beginning. Or, assign a third student to check answers.
- Refer to *Nimble With Numbers: Engaging Math Experiences to Enhance Number Sense and Promote Practice*, by Leigh Childs, Laura Choate, Karen Kenkins.
- Start at 99, and subtract the roll value of the number cubes instead of adding. The first player to reach zero wins.
- Use a six- or 12-sided die.
- Use three number cubes on a 200s chart.

Rounding It

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.2 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1c, 5.1a, 5.1b

Vocabulary: *ones*, *tens*, *hundreds*, *thousands*, *ten thousands*, *hundred thousands*, *place value*, *rounding*, *whole number*, *digits*, *period*

Materials: Spinner board and spinner (e.g., pencil or paper clip); recording sheet for each student; base-10 blocks

Time Required: 20 to 30 minutes

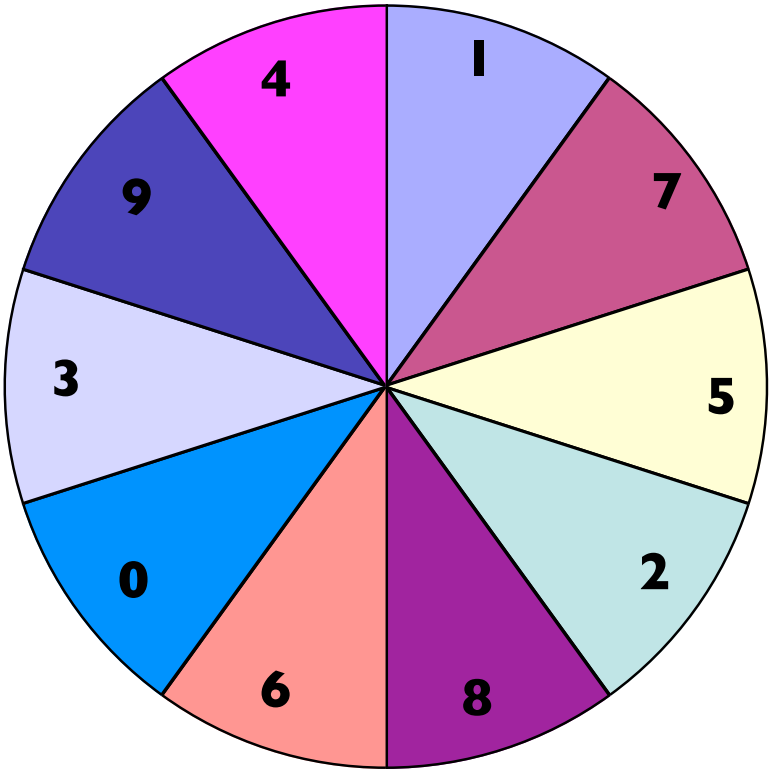
Directions:
Practice instructions: Have students practice rounding numbers by building a given number with base-10 blocks and then rounding that number to the nearest ten, hundred, or thousand. Have students use the physical models (base-10 blocks or a number line) to explain the rounding process.

1. Instruct students to take turns spinning the spinner to create a two-, three-, or four-digit number, according to the instructions on the recording sheet.
2. Have students write each number on the recording sheet as they spin it. It will take two, three, or four spins to create the numbers.
3. After students complete the number, ask them to round it to the nearest ten, hundred, or thousand, following the recording sheet instructions.
4. Students should write the rounded number on the recording sheet.

Exploration Questions:
- What is the value of a digit in a particular place?
- What happens when there isn't a number in a place? How do you write that number? Are you including the zero in the number?

Variations:
- Have students work with the number 2,549, exploring what happens when it's rounded to the nearest ten, hundred, and thousand. Students should compare their answers.

Spinner



Rounding It Recording Sheet

Name: _____

Number of Digits	Number Made	Round to the Nearest ____	Rounded Number
Sample 3	247	Ten	250
2		Ten	
2		Ten	
2		Ten	
3		Ten	
3		Hundred	
3		Hundred	
4		Thousand	
4		Hundred	
4		Hundred	
4		Thousand	

FOURTH GRADE
Number and Number Sense

Brownies

Format: Whole class

SOL Objectives:
4.2 The student will
a) identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures

Related SOL: 1.6, 2.4, 3.5, 3.6

Vocabulary: *fraction*, *mixed number*, *half*, *halves*, *fourths*, *eighths*, *whole*

Materials: A large sheet of paper with the title, "Brownies" (one per student); seven "brownies" (e.g., pieces of brown construction paper) per student

Time Required: 25 to 30 minutes

Directions:
1. Tell students that they are going to solve a "brownie" problem.
2. Give each student the large sheet of paper with the title, "Brownies," and ask them to draw a table (e.g., a rectangle) that seats four people.
3. Tell students that the four people around the table will need to share seven brownies.
4. Show students that the "brownies" are the seven pieces of brown construction paper, which are to be used to demonstrate how to share the brownies fairly.
5. Students may fold or draw on the construction-paper brownies to solve the brownie-sharing problem. Remind students that using a pencil to show their work is a good strategy. Students also should include their steps for sharing the brownies. Ask questions like:
    - How did you "cut" your brownies?
    - What is a fraction?
    - How do you know that each person got a "fair share"?
6. Have students discuss their discoveries with each other and with the class.
7. Have students compare strategies and restate a classmate's strategy in their own words.

The Rocky Digits

Format: Small groups, partners

SOL Objectives:

4.1 The student will

a) identify (orally and in writing) the place value for each digit in a whole number expressed through millions;

b) compare two whole numbers expressed through millions, using symbols (>, <, or =)

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2

Vocabulary: *ones, tens, hundreds, thousands, ten thousands, hundred thousands, millions, place value, rounding, digit, whole number, period, units*

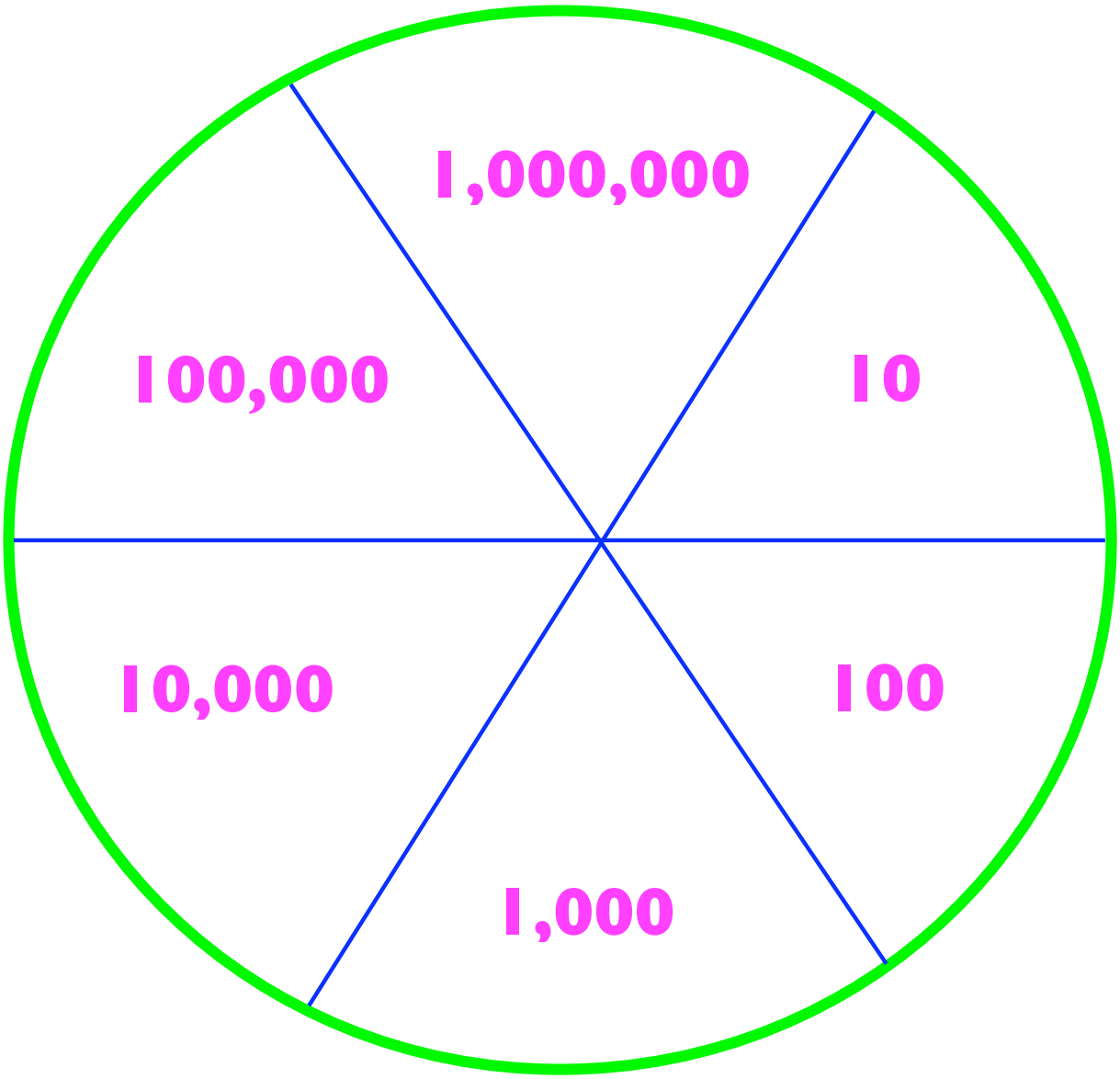
Materials: Digit cards (one set per group); game markers for each player (e.g., small stones); "The Rocky Digits" game board for each group; spinner board and spinner (e.g., pencil or paper clip) for each group

Time Required: 15 to 25 minutes

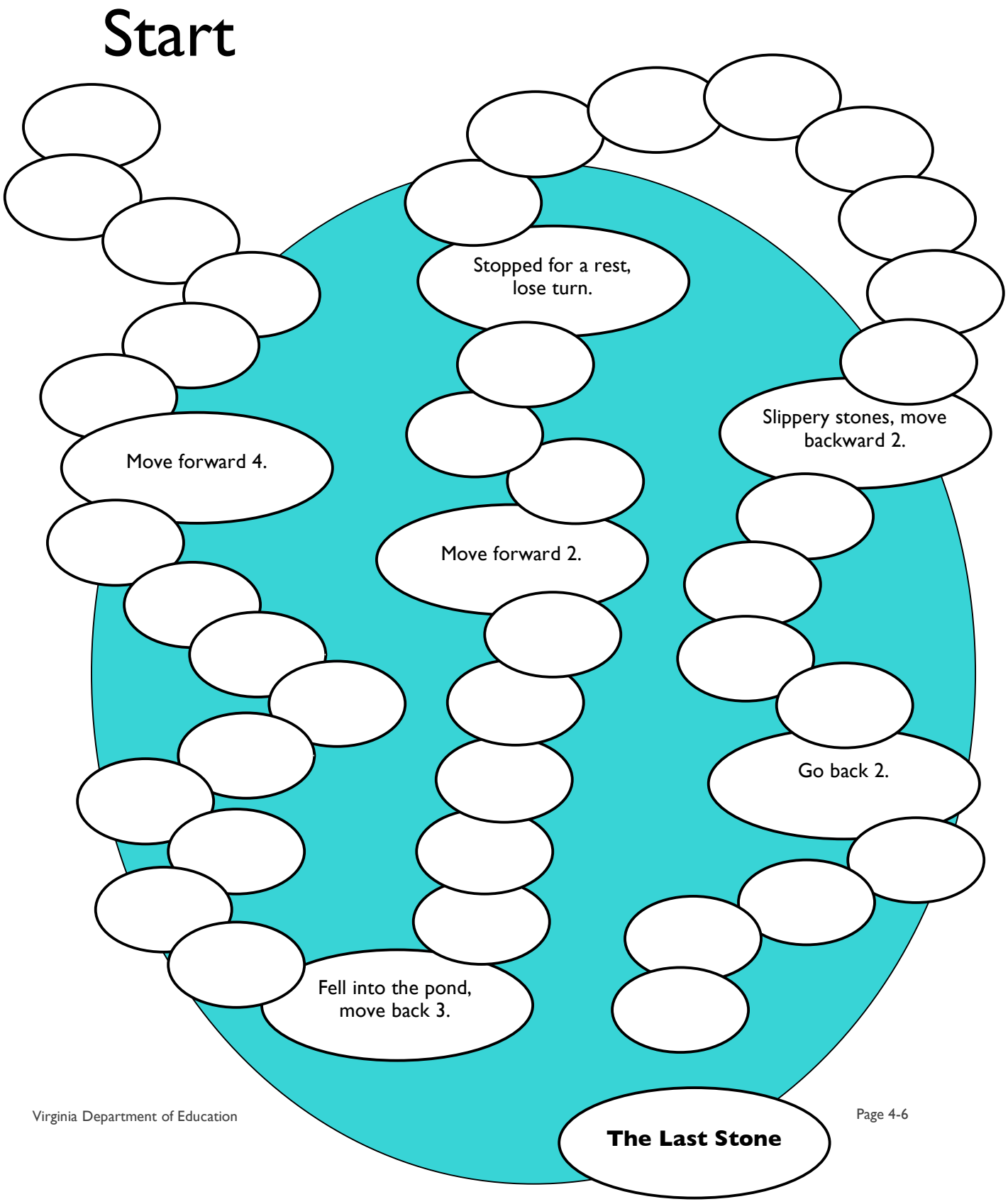
Directions:

1. Introduce this activity by reviewing place values.
2. Have students cut out the attached digit cards, and place the cards facedown in a pile.
3. Instruct all players to place their markers on "Start."
4. Players should take turns picking the top card from the pile and then spinning the spinner.
5. When the spinner stops, the player should name the number on the card that corresponds with the place value where the spinner landed. After other students have agreed with the player's answer, the player will move his or her marker that many spaces (i.e., the number in the named digit place) ahead on the game board. If the number on the card does not contain the place value on the spinner, the player loses a turn.
6. Players who land on spaces with directions must follow those directions.
7. The winner is the first person to reach the finish.

Spinner



The Rocky Digits



Digit Cards

1,673,126	1,408,234
2,327,245	1,308,601
731,518	292,567
1,202,469	1,021,321
3,105,304	473,518
708,246	123,152

2,101,921	1,247,317
815,384	583,561
2,008,773	964,232
524,789	3,106,528
815,437	756,243
4,569,262	100,744

1,239,761	8,280,310
6,544,473	2,080,554
2,183,270	7,883,090
3,350,302	402,004
530,182	1,208,241
2,183,270	7,883,090

To Be Half, or Not to Be Half…That Is the Comparison

Format: Partners

SOL Objectives:

4.2 The student will
a) identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;
b) represent equivalent fractions

4.3 The student will compare numerical value of fractions (with like and unlike denominators) having denominators of 12 or less, using concrete materials.

Related SOL: 1.6, 2.4, 3.6, 4.2

Vocabulary: *fraction*, *numerator*, *denominator*, *half*, *thirds*, *fourths*, *fifths*, *sixths*, *sevenths*, *eighths, tenths*, *greater than*, *less than*, *equal to*

Materials: One set of fraction cards per student; color tiles or fraction circles; fraction sorting mat; scissors

Time Required: 30 to 40 minutes

Directions:

This activity helps students become familiar with fractions, using concrete models to determine if a fractional part of a whole is less than $\frac{1}{2}$, equal to $\frac{1}{2}$, or greater than $\frac{1}{2}$.

1. Direct students to cut the fraction cards apart and shuffle them.
2. Use the fraction sorting mat labeled with three sections: "Less than $\frac{1}{2}$", "Equal to $\frac{1}{2}$", and "Greater than $\frac{1}{2}$".
3. Have students place the fraction cards facedown in a stack.
4. Ask students to place the color tiles, fraction circles, or other concrete fraction manipulative near the two players.
5. Ask students to take one whole and one $\frac{1}{2}$ manipulative and place above the game board to use as a benchmark.
6. Player One will take a fraction card from the top of the deck and determine if the fraction is "less than $\frac{1}{2}$", "equal to $\frac{1}{2}$", or "greater than $\frac{1}{2}$," and then place the fraction card in the appropriate section of the sorting mat. To prove that the card is in the correct place, Player One will need to use the manipulatives to build a model of the fraction and compare it to a model of $\frac{1}{2}$. If the other player agrees, Player One will earn one point. If Player One has placed the fraction card in the wrong section of the mat, he or she will not earn a point.
7. Player Two will now have a turn, following the same steps as Player One.
8. The players can keep score by tallying their points on the fraction sorting mat. Players earn one point for each correct placement. The player with the most points wins the game.

Fraction Cards

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{2}{4}$
$\frac{3}{4}$	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$
$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{5}{6}$
$\frac{1}{8}$	$\frac{2}{8}$	$\frac{3}{8}$	$\frac{4}{8}$	$\frac{5}{8}$
$\frac{6}{8}$	$\frac{7}{8}$	$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$

$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$
$\frac{1}{12}$	$\frac{2}{12}$	$\frac{3}{12}$	$\frac{4}{12}$	$\frac{5}{12}$
$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{10}{12}$
$\frac{1}{7}$	$\frac{2}{7}$	$\frac{3}{7}$	$\frac{4}{7}$	$\frac{5}{7}$

Fraction Sorting Mat

Less than ½	Equal to ½	Greater than ½

In Step with Numbers

Format: Partners

SOL Objectives:

4.1 The student will
a) identify (orally and in writing) the place value for each digit in a whole number expressed through millions;
b) compare two whole numbers expressed through the millions, using symbols (>, <, or =)

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2

Vocabulary: *ones, tens, hundreds, thousands, ten thousands, hundred thousands, millions, place value, rounding, digit, whole number, period, units*

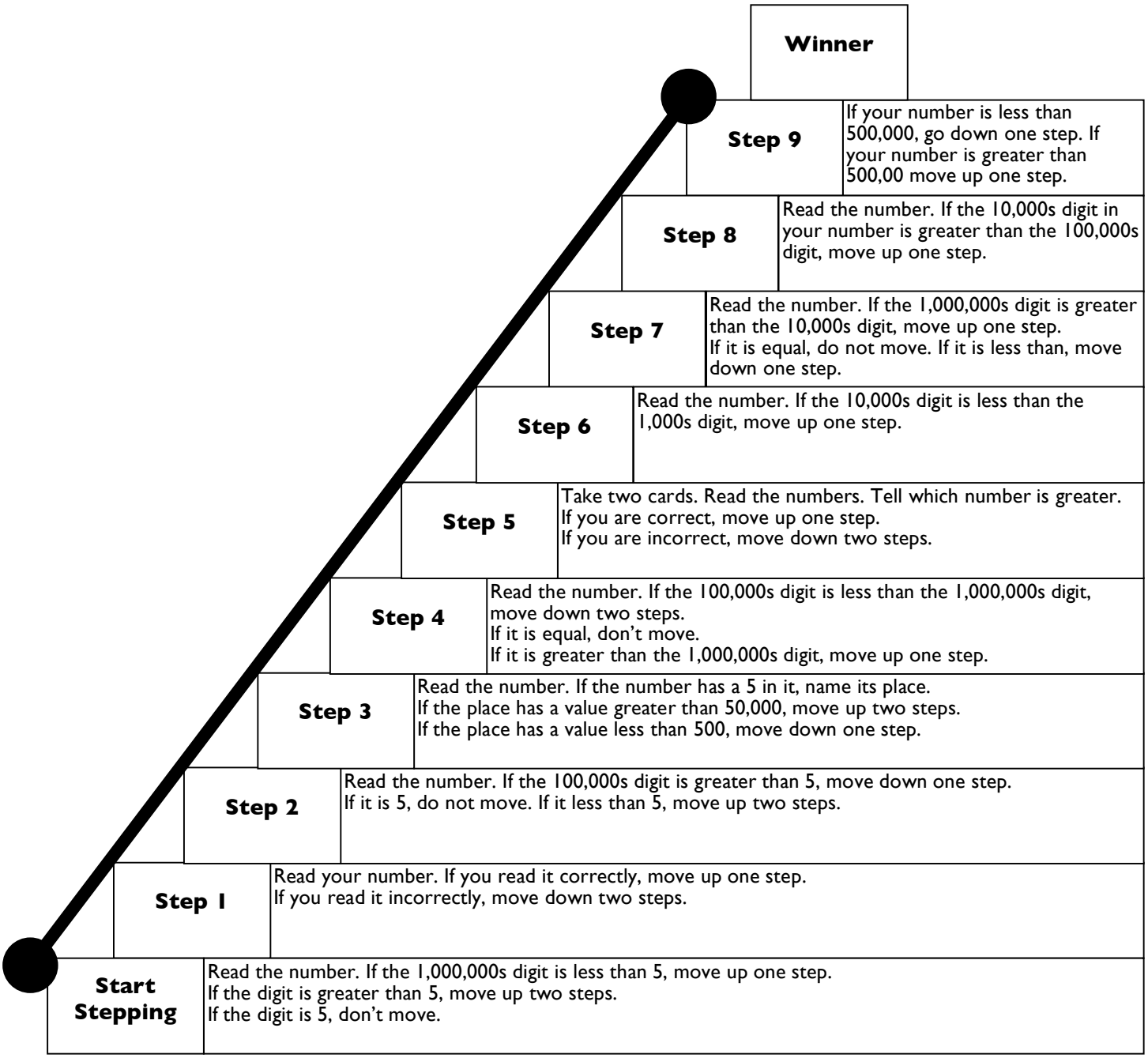
Materials: Number cards (one set per pair of students); game marker for each player; game board for "In Step with Numbers" (one per pair)

Time Required: 15 to 25 minutes

Directions:

1. Introduce the activity by reviewing place values.
2. Put the number cards facedown in a pile and have the players place their markers on "Start."
3. Player One picks a card from the top of the pile. The player then reads the directions beside the "step" that he or she is on. Player One *cannot* move to the next step if the directions are not followed, as agreed to by Player Two.
4. Player One concludes turn by placing the number card at the bottom of the pile.
5. Player Two follows the same steps as Player One.
6. The game continues until one of the players has successfully reached the top.

In Step With Numbers



Number Cards

1,791,926	2,648,134
2,987,245	3,125,691
6,134,548	1,892,657
3,187,469	4,377,821
2,581,385	3,483,518
6,118,749	8,129,152

1,239,760	4,828,030
4,569,262	5,144,794
6,544,473	2,080,554
4,983,279	7,083,090
7,350,302	2,908,534
6,578,102	3,418,241

Paper Bag Fractions

Format: Partners

SOL Objectives:
4.2 The student will
a) identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;
b) represent equivalent fractions

Related SOL: 1.6, 2.4, 3.6, 4.2

Vocabulary: *fraction*, *numerator*, *denominator*, *half*, *thirds*, *fourths*, *fifths*, *sixths*, *eighths*, *tenths*, *twelfths*, *greater than*, *less than*, *equal to*

Materials:
- One "Paper Bag Fraction" game board per pair (teachers can also create their boards); 20 to 25 counters to use as markers; one paper bag per pair; one set of fraction bars (student made or purchased). *Note:* The fraction bars are *not* the plastic pieces but rather the strips that are shaded to show an indicated fraction. It may be helpful to have students make their own fraction strips prior to playing the game. This task can be done by cutting 28 strips that are 1 x 6 for every student (using 9 x 12 or 12 x 18 paper makes it easier). Have students measure and shade their fraction bars as follows (students may color the bars as they choose):
  - One unit bar, no divisions
  - Two bars divided into two parts (3"). Shade one whole entirely, then $\frac{1}{2}$.
  - Three bars divided into thirds (2"). Shade one whole entirely, then $\frac{1}{3}$, then $\frac{2}{3}$.
  - Four bars divided into fourths (1.5"). Shade one whole entirely, then $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}$.
  - Six bars divided into sixths (1"). Shade one whole entirely, then $\frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}$.
  - Twelve bars divided into twelfths (0.5"). Shade one whole entirely, then $\frac{1}{12}, \frac{2}{12}, \frac{3}{12}, \frac{4}{12}, \frac{5}{12}, \frac{6}{12}, \frac{7}{12}, \frac{8}{12}, \frac{9}{12}, \frac{10}{12}, \frac{11}{12}$.

Time Required: 25 to 30 minutes

Directions:
1. Give partners a "Paper Bag Fraction" game board and one paper bag filled with the set of fraction bars. Place a container of counters and markers in the center of the table for students to share.
2. The object of the game is to cover five fractions in a row—horizontally, vertically, or diagonally. Each player will take a turn choosing a fraction bar from the paper bag, naming the fraction, and marking one fraction on the game board. After each turn, the player should return the fraction bar to the bag. The next player will choose a fraction bar from the bag and mark one answer on the game board, returning the fraction bar to the paper bag.
3. A strategy for the opponent is to block the other player from placing five counters in a row.
4. The first player to cover five fractions in a row wins.

Variations:
- Allow students to cover an equivalent fraction for the fraction bar that has been taken from the paper bag.

Paper Bag Fraction Game Board

$\frac{1}{4}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{12}$	$\frac{3}{6}$
$\frac{1}{2}$	$\frac{5}{12}$	$\frac{1}{3}$	$\frac{2}{4}$	$\frac{2}{6}$
$\frac{4}{4}$	$\frac{2}{6}$	$\frac{4}{6}$	$\frac{3}{3}$	$\frac{3}{12}$
$\frac{10}{12}$	$\frac{2}{2}$	$\frac{8}{12}$	$\frac{5}{6}$	$\frac{4}{12}$
$\frac{7}{12}$	$\frac{4}{8}$	$\frac{9}{12}$	$\frac{1}{6}$	$\frac{11}{12}$

Rounding Match

Format: Individual, partners

SOL Objectives:

4.1 The student will
a) identify (orally and in writing) the place value for each digit in a whole number expressed through millions;
b) compare two whole numbers expressed through millions, using symbols (>, <, or =); and
c) round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2

Vocabulary: *ones, tens, hundreds, thousands, ten thousands, hundred thousands, millions, place value, rounding, digit, whole number, period, units*

Materials: A deck of "Rounding Match" cards per student or pair (copy the cards on cardstock and store in a baggie)

Time Required: 10 to 15 minutes

Directions:

1. Make sets of the "Rounding Match" card deck.
2. Have students, individually or in pairs, separate the cards into two piles. One pile will be cards that contain numbers with an underlined digit; the second pile will be numbers that end in zeros.
3. Have students place these two piles faceup on their desks, making sure not to mix the two piles.
4. Students will take turns collecting rounding matches. Player One chooses a card from the "underlined" pile. The student must name the place with the underlined digit. The underlined digit indicates the place that the number will be rounded to.
5. Player One looks through the other pile to find the "rounding match" for the number chosen from pile one. If Player Two agrees with the "rounding match," then Player One gets to keep the match. Players take turns until all cards have matches.
6. The player with the most "rounding matches" is the winner.

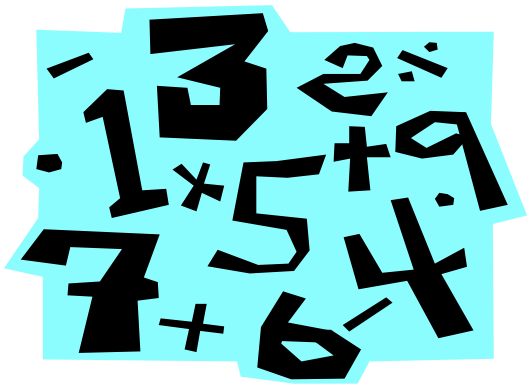
Rounding Match Cards

536,780	540,000
5,638,321	5,600,000
8,042	8,000
54,906	50,000
15,387	20,000
13,097	10,000
54,682	55,000
9,302	9,000
483,102	500,000
2,473,361	2,500,000

740,678	700,000
4,971	5,000
1,743	1,700
8,416	8,420
5,132,630	5,130,00
804,234	800,000
8,416	8,400
3,761	3,800
2,560,954	2,600,000
1,754,231	1,800,000

2,862,641	2,860,000
756,910	760,000
2,387,105	2,390,000
2,822,716	2,820,000
367,098	367,000
2,345,011	2,350,000
133,947	130,000
6,012,509	6,013,000
5,097,432	5,100,000

FIFTH GRADE
Number and Number Sense



Fishing for Decimals/Fractions

Format: Small groups, partners

SOL Objectives:

5.2 The student will

a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa;

Related SOL: 4.2b,c

Vocabulary: *equivalent*, *fractions*, *decimals*, *tenth*, *hundredth*, *thousandth*

Materials: Fraction and decimal game cards; pencil and paper

Time Required: 30 minutes

Directions:

The game is played like the "Go Fish" card game.

1. Each player is dealt five cards. The remaining cards are placed in the middle of the playing area to be used as the "fishing" pile.
2. At each turn, the player asks another player for a card he or she needs to make a pair. If the other player has the card, he or she must give it to the player who asked for it. The player then lays down the matched pair. If the other player does not have the desired card, then the first player must "go fish" by drawing another card from the pile.
3. The first player to match all of his or her cards, and thus have no cards remaining in hand, is the winner.

Game Cards

$\frac{1}{2}$	0.50	$\frac{1}{5}$	0.20	$\frac{1}{4}$
$\frac{5}{6}$	0.83	$\frac{3}{5}$	0.60	$\frac{3}{4}$
$\frac{3}{8}$	0.375	$\frac{3}{10}$	0.30	$\frac{4}{5}$

0.80	$\frac{1}{8}$	0.125	$\frac{2}{5}$	0.40
$\frac{5}{8}$	0.25	$\frac{7}{8}$	0.875	$\frac{7}{10}$
0.70	$\frac{9}{10}$	0.90	0.25	0.75

Line-Up

Format: Small groups, partners

SOL Objectives:
5.2 The student will
b) order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Related SOL: 4.2b,c

Vocabulary: *least to greatest*, *decimal*, *fractions*, *denominators*, *numerators*

Materials: Paper and pencils; number cards containing fractions and decimals, sentence strips

Directions:
1. Give each group or pair of students a number line marked 0_____$\frac{1}{2}$_____1. (Use a sentence strip for the number line.)

2. Suggested numbers for the number card sets:

   $\frac{1}{2}$, 0.91, 0.04, 0.89, 0.51, $\frac{2}{8}$

   $\frac{3}{10}$, 0.37, 0.08, 0.65, 0.71, $\frac{3}{5}$

   $\frac{1}{5}$, 0.81, 0.07, 0.43, 0.21, $\frac{1}{4}$

   $\frac{2}{5}$, $\frac{7}{10}$, 0.50, 0.03, 0.71, 0.42

   0.73, 0.06, 0.25, 0.76, $\frac{1}{2}$, $\frac{3}{4}$

3. Give the group or pair a set of number cards that contain both fractions and decimals. Working together, the students must decide where each number fits on the given number line. The students will place the cards on the number line from least to greatest. Once all students have completed their number lines, students may move around the room checking each other's number lines.
4. Bring the students back into the pairs/groups and discuss why the numbers were placed on the number line at each point.

Exploratory Questions:
- Why were the numbers placed on the number line at each point?
- How did you know which was least and which was greater?

Decimal Spokes

Format: Small groups, partners

SOL Objectives:

5.1 The student will
a) read, write, and identify the place values of decimals through thousandths;
b) round decimal numbers to the nearest tenth or hundredth; and
c) compare the values of two decimals through thousandths, using the symbols >, <, or =.

Vocabulary: *tenths*, *hundredths*, *thousandths*, *round*, *compare*, *greater than*, *less than*, *equal to*

Materials: Game board; die or spinner; game cards; game pieces

Time Required: 20 to 30 minutes

Directions:

1. Instruct students that the object of this activity is to move one's game piece across the game board spokes, through the center to another spoke, and back to the original starting point by reading, identifying, rounding, and comparing decimals correctly.
2. Each student in the pair or group of four will roll the die (or spin the spinner) once, to determine who will go first.
3. Instruct the first player to choose a card and read the number or answer the question aloud. If the other players agree that the answer is correct, the first player rolls (or spins the spinner) and moves that many spaces. If the player provided an incorrect answer, that player may not roll the die (or spin the spinner), and must stay in place.
4. Players may share a space with only one other team member. If a third player lands on the same space, that player must redo the roll or spin.
5. The first player back to his or her spoke wins the game.
6. Additional blank cards are included if you wish to make game cards.

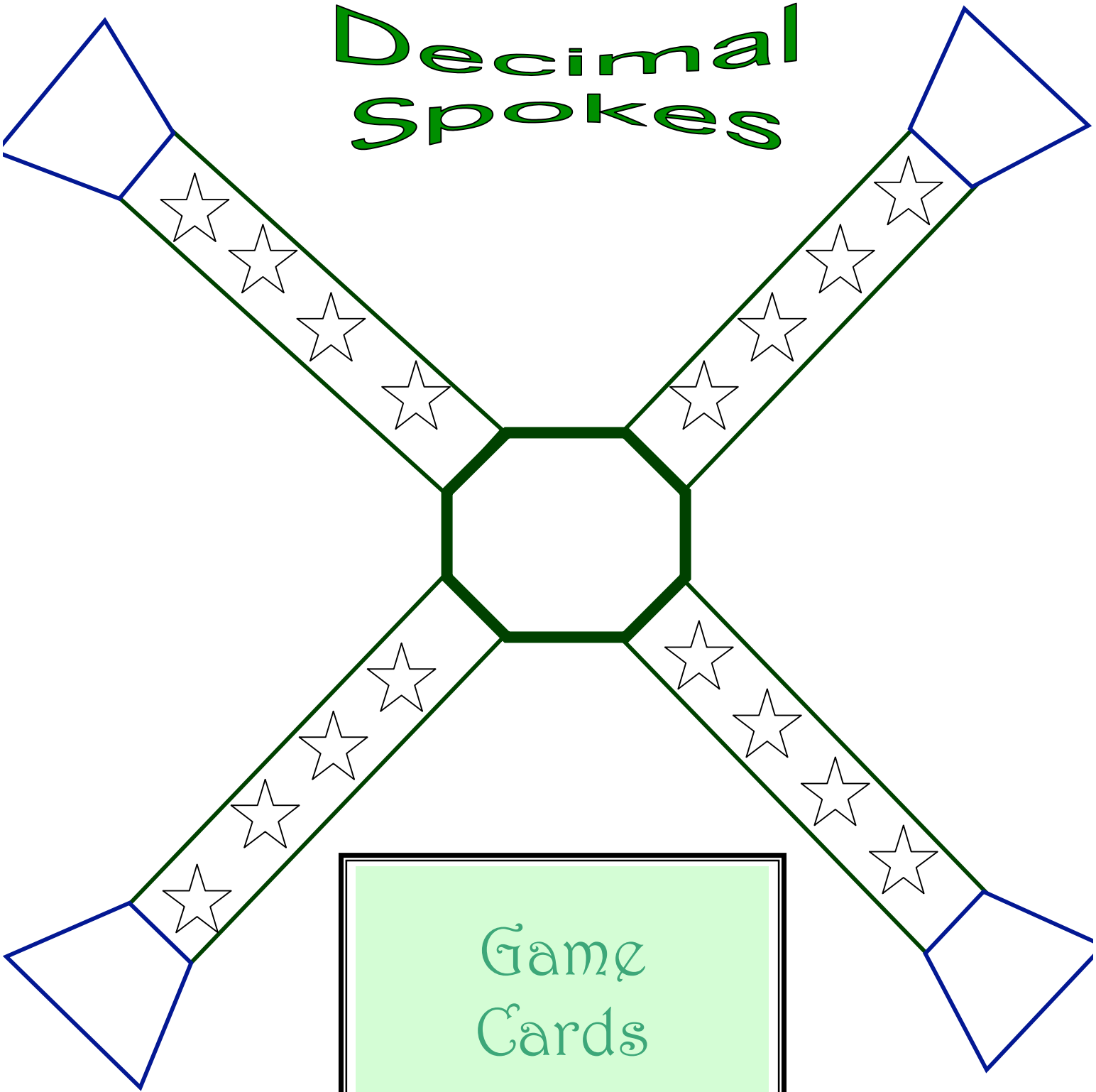
Decimal Spokes Game Cards

Read the following number: 29.513	Read the following number: 0.84	Read the following number: 4.761
Read the following number: 73.804	Read the following number: 0.053	Read the following number: 0.107
Round 0.528 to the nearest hundredth.	Round 0.782 to the nearest hundredth.	Round 9.625 to the nearest hundredth.

Round 3.501 to the nearest tenth.	Round 21.94 to the nearest tenth.	Round 6.826 to the nearest tenth.
< > = Which symbol completes the statement below: **0.927 __ 0.792**	**< > =** Which symbol completes the statement below: **6.250 __ 6.205**	**< > =** Which symbol completes the statement below: **0.216 __ 0.27**
< > = Which symbol completes the statement below: **0.48 __ 0.395**	**< > =** Which symbol completes the statement below: **8.72 __ 8.702**	**< > =** Which symbol completes the statement below: **0.73 __ 0.730**

< > = Which symbol completes the statement below: **0.936 __ 0.937**	**< > =** Which symbol completes the statement below: **0.082 __ 0.82**	**< > =** Which symbol completes the statement below: **0.7 __ 0.16**
< > = Which symbol completes the statement below: **0.058 __ 0.581**	**< > =** Which symbol completes the statement below: **0.41 __ 0.9**	**< > =** Which symbol completes the statement below: **0.731 __ 0.713**

Decimal Spokes



Game Cards

Fraction/Decimal Combo

Format: Small groups

SOL Objectives:
5.1 The student will
a) read, write, and identify the place values of decimals through thousandths;
b) round decimal numbers to the nearest tenth or hundredth

Related SOL: 4.2b,c; 3.5; 3.6

Vocabulary: *equivalent*, *fraction*, *decimal*

Materials: 20 index cards for each group; pencils; paper; list of fractions

Time Required: 30 minutes

Directions:
1. Give 20 index cards to each group of students.
2. Provide students with a list of fractions and equivalent decimals.
3. Have each group write one fraction per card on the first 10 cards.
4. Next, have the groups write decimals, one per card, on the remaining 10 cards. The decimals must be equivalent to the fractions written on the first 10 cards (see example below).

Example:

$\frac{1}{4}$
0.25

5. Instruct groups to exchange cards with another group. When you say, "go," the groups must sort the cards from least to greatest using the fractions. Then they must put the equivalent decimal card under each fraction. The first group to correctly complete the task is the winner.

Suggested Fractions and Equivalent Decimals

Fractions	Decimals
$\frac{2}{2}$	1.0
$\frac{1}{2}$	0.50
$\frac{1}{4}$	0.25
$\frac{3}{4}$	0.75
$\frac{1}{5}$	0.20
$\frac{2}{5}$	0.40
$\frac{3}{5}$	0.60
$\frac{4}{5}$	0.80
$\frac{1}{8}$	0.125
$\frac{3}{8}$	0.375
$\frac{5}{8}$	0.625
$\frac{7}{8}$	0.875
$\frac{1}{10}$	0.10
$\frac{3}{10}$	0.30
$\frac{7}{10}$	0.70
$\frac{9}{10}$	0.09

Fractions and Decimals…Out to Dry

Format: Small groups

SOL Objectives:

5.2 The student will

b) order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Vocabulary: *least*, *greatest*, *order*, *fractions*, *decimals*, *mixed numbers*

Materials: Yarn, clothesline; clothes pins; number cards; recording sheets; pencils; calculator (optional)

Time Required: 20 to 30 minutes

Directions:

1. Create five groups (decks) of number cards, each including fractions, decimals, and mixed numbers.
2. Place each deck of cards at a learning station in the classroom.
3. Have students work in small groups to order the number cards from least to greatest and place them on the clothesline. Students should record their results on the handout provided.
4. Check for accuracy and replace the decks. Then have the students rotate to the next station, until all groups have completed all five decks.

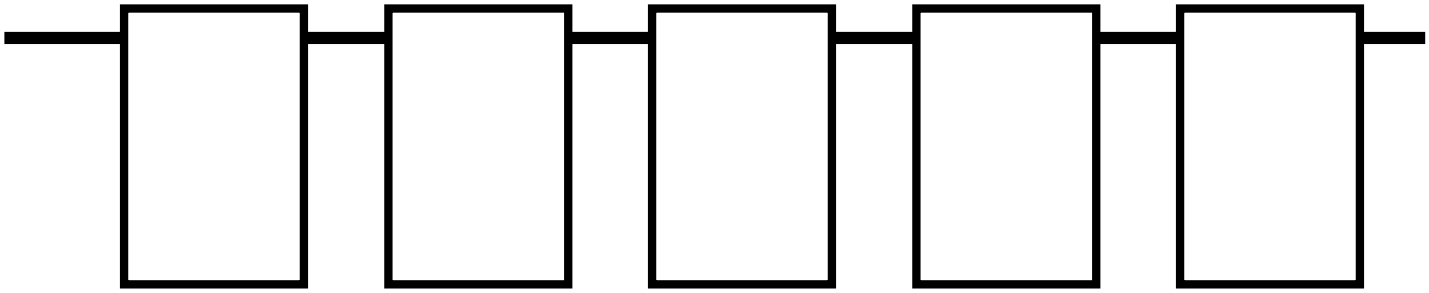
Sample "deck" combination:

0.625, $\frac{3}{4}$, $1\frac{1}{5}$, 0.15, $\frac{1}{2}$

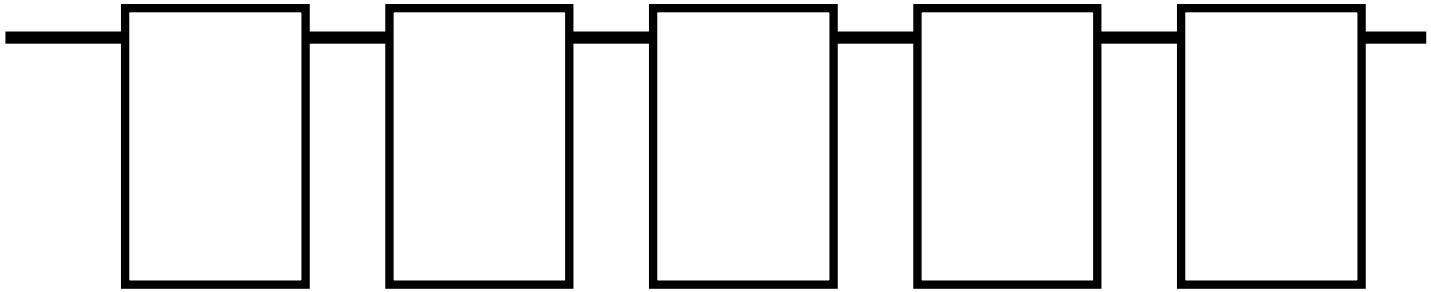
Fractions and Decimals…Out to Dry

Name _____ Date_____

DECK A



DECK B



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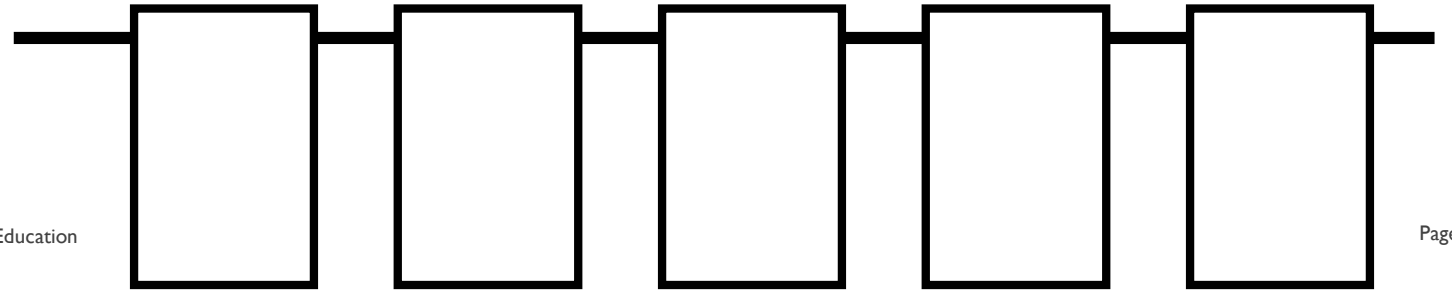
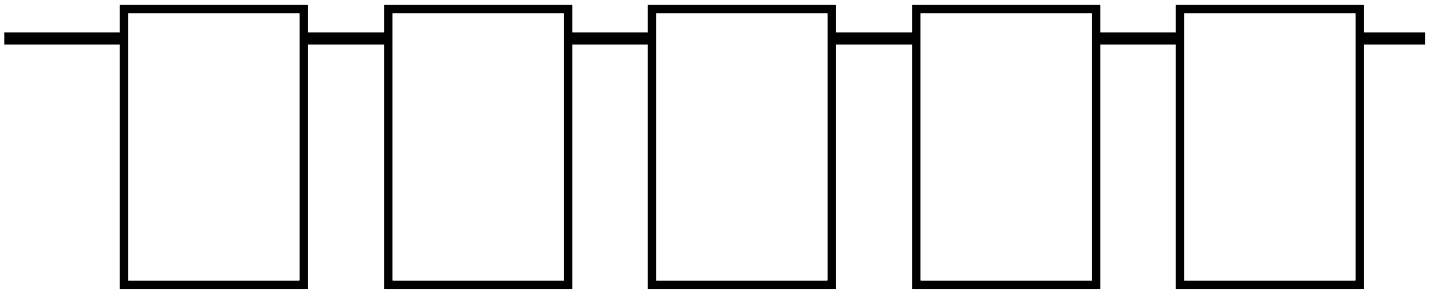
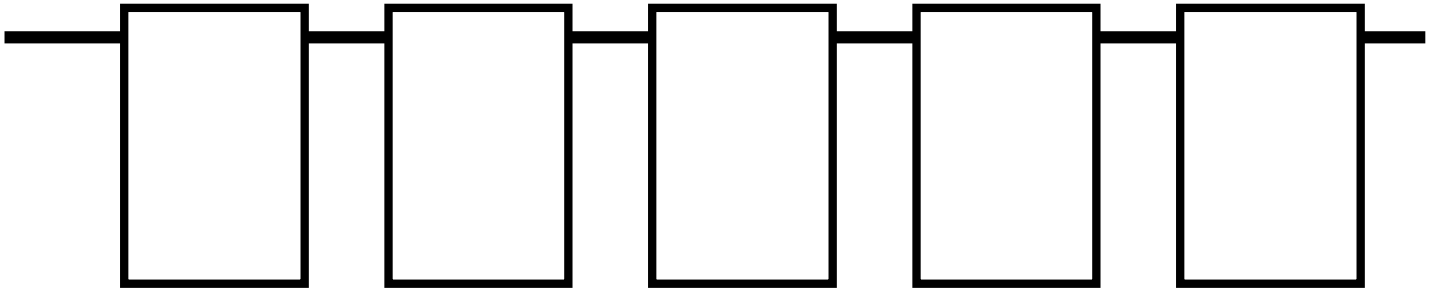


DECK D



DECK E



Decimal War

Format: Partners

SOL Objectives:
5.1 The student will
a) read, write, and identify the place values of decimals through thousandths

Related SOL: 5.1c

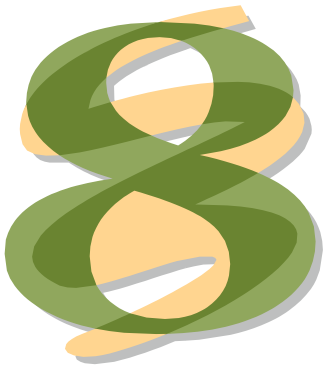
Vocabulary: *tenths*, *hundredths*, *thousandths*, *compare*, *greater than*, *less than*, *equal* to

Materials: Game board; number cards (four sets); game pieces; pen/marker; die or spinner

Time Required: 20 to 30 minutes

Directions:
1. Explain to students that the object of the "Decimal War" game is to create a decimal number larger than your opponent's.
2. Using the number cards provided, each player will draw a card. The player that draws the larger number will go first. (Players should put their cards back in the deck and shuffle the number cards before play begins.)
3. Player One draws a card from the top of the deck, shows the card to Player Two, and records the number in one of the decimal place columns on the recording sheet. (The player should *not* allow the opponent to see which decimal place was chosen.) Once the player decides on a decimal place, the number cannot be moved.
4. Player Two then draws a card, shows it to Player One, and records the number in a decimal place column on the recording sheet. (Again, the opponent should not be allowed to see which decimal place was chosen.) Once the player decides on a decimal place, the number cannot be moved.
5. Repeat steps 3 and 4 until the row on the recording sheet is filled and a number has been created.
6. Players compare numbers, and the one with the larger number rolls the die (or spins the spinner) and moves his or her game piece on the game board.
7. Players move to the next row on the recording sheet and repeat steps 3 through 6 until one player crosses the finish line, winning the game.

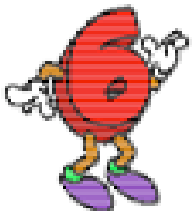
Number Cards



Decimal Place Value Chart

ONES	TENTHS	HUNDREDTHS	THOUSANDTHS

Decimal War

START		Go Back 1 Space		
				Go Forward 2 Spaces
Move Forward 2 Spaces		FINISH		
				
Lose a Turn				Go Back 3 Spaces

Memory Place Value: Decimal Match

Format: Small groups, partners

SOL Objectives:

5.1 The student will
a) read, write, and identify the place values of decimals through thousandths; and
b) round decimal numbers to the nearest tenth or hundredth.

Vocabulary: *tenths*, *hundredths*, *thousandths*, *round*

Materials: Memory game cards; die; recording sheet

Time Required: 15 to 20 minutes

Directions:

1. Place all of the memory cards facedown on a playing surface.
2. Each student will roll the die once. The student with the highest roll will go first.
3. The first player will turn over two cards in an attempt to find a match.
4. If the player has a match, he or she will record the match on the recording sheet, then play passes to the next student.
5. If the player does not have a match, play passes to the next student who will try to find a match.
6. The game is over once all of the cards have been matched. The player with the most decimal matches wins the game.

Variations:

- Ask students to order the decimals on their recording sheets from least to greatest.
- Have students round the decimals to the nearest place. (Underline one digit on the cards prior to students playing the game.)

Memory Cards

3.817	Three and eight hundred seventeen thousandths
0.092	Ninety-two thousandths
4.201	Four and two hundred one thousandths
0.386	Three hundred eighty-six thousandths

0.374	Three hundred seventy-four thousandths
0.306	Three hundred six thousandths
8.92	Eight and ninety-two hundredths
1.503	One and five hundred three thousandths

0.738	Seven hundred thirty-eight thousandths
0.902	Nine hundred two thousandths
0.064	Sixty-four thousandths
0.433	Four hundred thirty-three thousandths

0.203	Two hundred three thousandths
0.418	Four hundred eighteen thousandths
0.359	Three hundred fifty-nine thousandths
0.794	Seven hundred ninety-four thousandths

0.14	Fourteen hundredths
0.85	Eighty-five hundredths
0.725	Seven hundred twenty-five thousandths
0.87	Eighty-seven hundredths

Name: _____

Memory Place Value Game
Recording Sheet

Standard Form	Word Form	Rounded Decimal

Model Match

Format: Individual, partners, or small groups

SOL Objectives:
5.1 The student will
a) read, write, and identify the place values of decimals through thousandths

Related SOL: 4.4

Vocabulary: *tenths*, *hundredths*, *word form*, *model*

Materials: Recording sheets, copy of model cards, and decimal cards

Time Required: 20 minutes

Directions:
1. Each individual or group should receive a set of model cards, written-form cards, and standard-form cards. (It is helpful if you pre-cut and prepare cards for students.)
2. Students may work individually or in groups to match the written form of a decimal to the standard form and the model card of each decimal.
3. Once students have matched the three cards for each decimal, they should record their matches on the recording sheet provided.
4. You can use the sample decimal recording sheet to demonstrate how you would like students to record their work. For the picture column, have students draw a model of the decimal like the one found on the matching model card, or use base-10 blocks.

Variations:
• Have students distribute the cards among the members of their group and then play "Go Fish" to find the matches of the three forms of the decimal.

Name_____

DECIMALS SAMPLE RECORDING SHEET

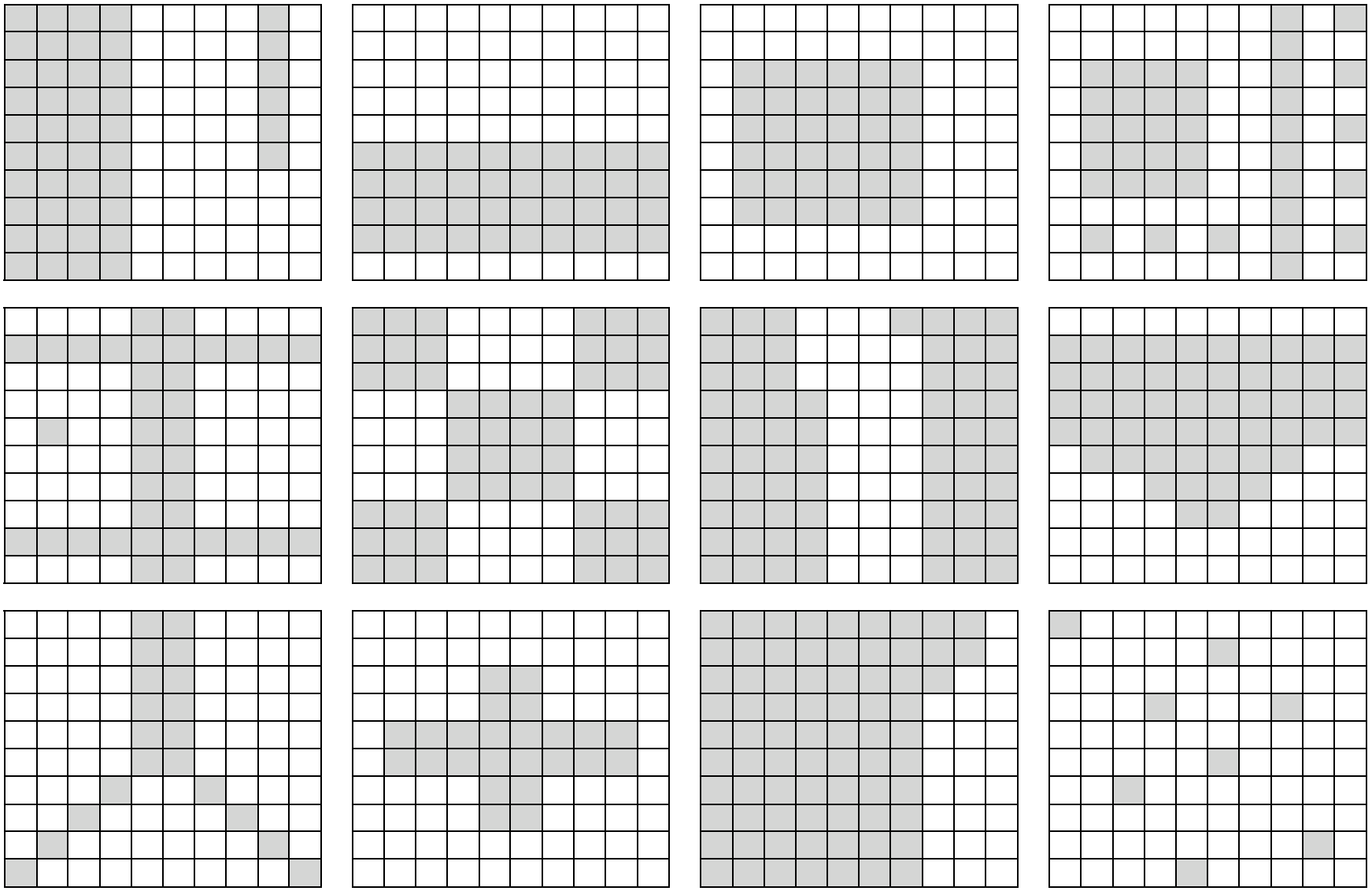
WORD FORM	STANDARD FORM	PICTURE
sixteen hundredths		
	0.06	
	0.25	
Thirty-four hundredths		

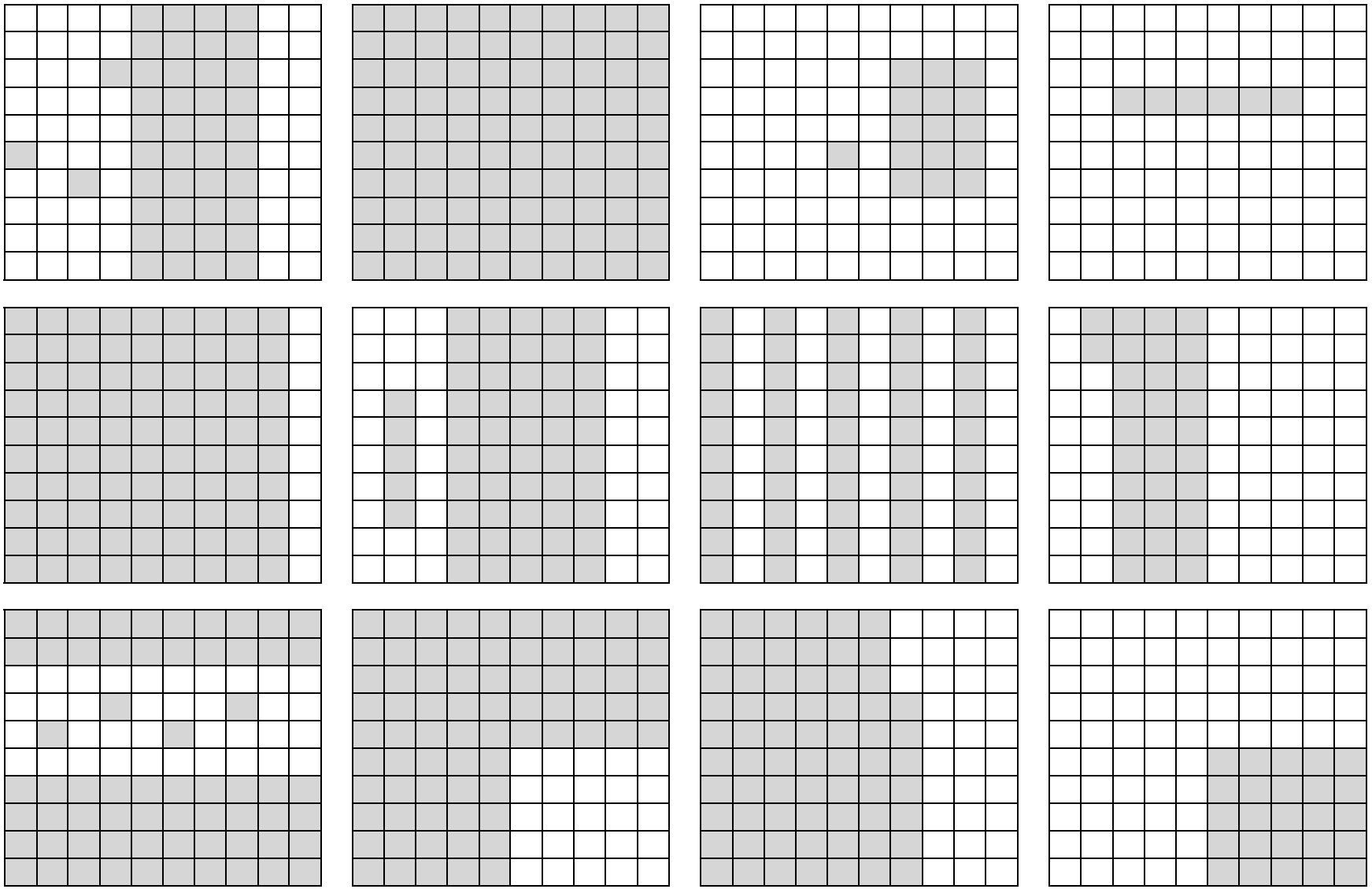
Name_____

DECIMALS RECORDING SHEET

WORD FORM	STANDARD FORM	PICTURE

Model Cards





Standard-Form Cards

0.56	0.68	0.52	0.53
0.4	0.06	0.43	0.96
0.34	0.64	1	0.16
0.2	0.08	0.32	0.75
0.24	0.55	0.67	0.25
0.75	0.5	0.36	0.37

Written-Form Cards

fifty-six hundredths	sixty-eight hundredths	fifty-two hundredths	fifty-three hundredths
four tenths	six hundredths	forty-three hundredths	ninety-six hundredths
thirty-four hundredths	sixty-four hundredths	one whole	sixteen hundredths
two tenths	eight hundredths	thirty-two hundredths	seventy-five hundredths
twenty-four hundredths	fifty-five hundredths	sixty-seven hundredths	twenty-five hundredths
seventy-five hundredths	five tenths	thirty-six hundredths	thirty-seven hundredths

My Numbers

Format: Whole class, small groups

SOL Objectives:

5.1 The student will
a) read, write, and identify the place values of decimals through thousandths;
b) round decimal numbers to the nearest tenth or hundredth; and
c) compare the values of two decimals through thousandths, using the symbols >, <, or =.

5.2 The student will
a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and
b) order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Related SOL: 4.2, 4.4, 3.6, 3.7

Vocabulary: *whole numbers*, *decimals*, *fractions*, *mixed numbers*, *relevant numbers*

Materials: Transparencies and overhead projector, or whiteboard; paper and pencil

Time Required: 30 minutes

Directions:

1. Using the overhead transparency, or the whiteboard, write 10 or more numbers related to your personal life.
2. Provide a clue for each number, and have students try to match the clue with each number (e.g., "In which year was I born? How many years have I been teaching? How many brothers and sisters do I have? How far do I live from school?").
3. Discuss student responses and how they came to those conclusions.
4. Have students create their own list of personal numbers (8 to 12 numbers) and their own matching clues (see examples below).
5. Students will work in pairs or small groups to exchange lists of numbers and clues.
6. Bring students back together as a whole class to discuss how they matched clues to the numbers. What were their strategies for choosing numbers?

Examples for Students:

Number List: 1998, 10, 2, 5, .75, 1,210, $6\frac{2}{3}$, 62

Clues:

- The year I was born (1998)
- My age (10)
- Number of siblings (2)
- My grade (5)
- Amount of change in my pocket (.75)
- Number of pennies in my piggy bank (1,210)
- Number of miles from my home to school ($6\frac{2}{3}$)
- Age of my grandpa (62)

Roll 'em

Format: Partners

SOL Objectives:
5.1 The student will
b) round decimal numbers to the nearest tenth or hundredth

Related SOL: 5.1b and 4.4b

Vocabulary: *estimate*, *round*, *decimals*, *hundredths*, *tenths*

Materials: Three number cubes per pair, pencil and paper

Time Required: 15 to 20 minutes

Directions:
1. Player One rolls the three number cubes and puts the three numbers together to form a decimal, then rounds the decimal to the nearest hundredth.
2. Player Two checks the number to make sure it is rounded to the nearest hundredth. If it is correct, Player One gets a point.
3. Player Two rolls the number cubes, makes a decimal, and rounds it to the nearest hundredth. Player One checks the number and, if correct, Player Two scores one point.
4. If a player rounds the number incorrectly, that player must subtract two points from his or her score.
5. Play continues until a score of 10 is reached or you call time.

Note: This is a quick way to determine if a student knows how to round decimals.

Decimal Board Activities

Format: Small groups, whole class

SOL Objectives:

5.1 The student will
c) compare the values of two decimals through thousandths, using the symbols >, <, or =.

5.2 The student will
a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa

Related SOL: 4.4a,c

Vocabulary: *tenths*, *hundredths*, *thousandths*, *greater than*, *less than*, *equal to*, *compare*

Materials: Decimal board, chips or crayons, paper and pencil

Time Required: 15 to 20 minutes

Directions:

1. Provide each student with a decimal board and chips or crayons to cover answers on their decimal board.
2. Using the provided question lists, ask students to determine the answer, and then cover the corresponding decimal on their decimal board.
3. Play continues until students discover a hidden picture after covering the appropriate decimal numbers. Check for accuracy.

Note: Four sets of questions are included for use with the decimal boards. However, there are many other sets of questions that you may come up with for the decimal boards.

NAME_____

DECIMAL BOARD

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.6
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.7
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.8
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.9
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.0

Game Questions for Decimal Board 1

1. What is two hundredths less than thirty-five hundredths? **0.33**
2. What is four hundredths less than forty-seven hundredths? **0.43**
3. What is three hundredths less than six tenths? **0.57**
4. What is two hundredths less than two tenths? **0.18**
5. What is four hundredths less than fifty-eight hundredths? **0.54**
6. What is two hundredths less than forty-nine hundredths? **0.47**
7. What is two hundredths less than twenty-seven hundredths? **0.25**
8. What is one hundredth less than fifteen hundredths? **0.14**
9. What is three hundredths less than twenty-five hundredths? **0.22**
10. What is one hundredth less than fifty-four hundredths? **0.53**
11. What is two hundredths less than fifty-eight hundredths? **0.56**
12. What is seven hundredths less than two tenths? **0.13**
13. What is three hundredths less than nineteen hundredths? **0.16**
14. What is five hundredths less than six tenths? **0.55**
15. What is two hundredths less than thirty-nine hundredths? **0.37**
16. What is one hundredth less than twenty-nine hundredths? **0.28**
17. What is three hundredths less than two tenths? **0.17**
18. What is four hundredths less than sixteen hundredths? **0.12**

Decimal Board 1 Key

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.6
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.7
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.8
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.9
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.0

Game Questions for Decimal Board 2

Use your decimal board to help you extend or complete the pattern. Place a chip, or color, the next decimal number in the pattern.

1. 0.05, 0.1, _____
2. 0.27, 0.36, 0.45, _____
3. 0.1, 0.08, 0.06, _____
4. 0.5, 0.45, 0.4, _____
5. 0.2, 0.4, _____
6. 0.45, 0.35, _____
7. 0.14, 0.16, 0.18, 0.2, _____
8. 0.3, 0.33, 0.35, 0.38, 0.4, 0.43, _____
9. 0.12, 0.16, 0.2, 0.24, _____
10. 0.59, 0.58, 0.57, _____
11. 0.01, 0.04, 0.07, 0.1, _____
12. 0.22, 0.29, 0.36, _____
13. 0.47, 0.37, 0.27, _____
14. 0.02, 0.12, 0.22, _____
15. 0.09, 0.11, 0.18, 0.2, 0.27, 0.29, 0.36, _____
16. 0.5, 0.49, 0.48, _____

Decimal Board 2 Key

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.6
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.7
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.8
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.9
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.0

Game Questions for Decimal Board 3

1. Which is less 0.01 or 0.02?
2. Which is more 0.09 or 0.1?
3. Which is more 0.11 or 0.12?
4. Which is more 0.01 or 0.09?
5. Which is more 0.23 or 0.22?
6. Which is less 0.18 or 0.81?
7. Which is less 0.34 or 0.43?
8. Which is less 0.27 or 0.28?
9. Which is more 0.45 or 0.35?
10. Which is less 0.36 or 0.62?
11. Which is less 0.54 or 0.60?
12. Which is more 0.56 or 0.46?
13. Which is less 0.63 or 0.65?
14. Which is more 0.67 or 0.66?
15. Which is more 0.37 or 0.72?
16. Which is more 0.77 or 0.78?
17. Which is less 0.89 or 0.79?
18. Which is less 0.91 or 0.81?
19. Which is less 0.91 or 1.0?
20. Which is less 1.0 or 2.0?

Decimal Board 3 Key

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.6
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.7
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.8
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.9
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.0

Questions for Decimal Board 4

Round each problem to the nearest hundredth:

1. 0.234 (0.23)
2. 0.274 (0.27)
3. 0.453 (0.45)
4. 0.571 (0.57)
5. 0.633 (0.63)
6. 0.750 (0.75)
7. 0.154 (0.15)
8. 0.235 (0.24)
9. 0.430 (0.43)
10. 0.438 (0.44)
11. 0.247 (0.25)
12. 0.256 (0.26)
13. 0.669 (0.67)
14. 0.553 (0.55)
15. 0.345 (0.35)
16. 0.635 (0.64)
17. 0.468 (0.47)
18. 0.333 (0.33)
19. 0.457 (0.46)
20. 0.661 (0.66)
21. 0.652 (0.65)

Decimal Board 4 Key

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.6
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.7
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.8
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.9
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.0

What's My Number?

Format: Whole class, small groups

SOL Objectives:

5.1 The student will
a) read, write, and identify the place values of decimals through thousandths;
b) round decimal numbers to the nearest tenth or hundredth; and
c) compare the values of two decimals through thousandths, using the symbols >, <, or =.

5.2 The student will
a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and
b) order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Related SOL: 4.4
(Note: This activity can be adapted for whole number concepts in grades 1-3.)

Vocabulary: *tenths*, *hundredths*, *thousandths*, *fractions*, *decimals*, *rounding*, *greater than*, *less than*, *equivalent*

Materials: Set of "secret" decimal numbers on index cards (to be created by instructor, with decimals ranging from 0.01 to 10.0)

Time Required: 10 to 15 minutes

Directions:

1. Model an example of the activity by asking a student to choose a "secret" decimal card. *(For demonstration purposes, share the secret number with the participating student—0.75.)*
2. Ask the student "yes" or "no" questions to obtain clues about the secret decimal number. For example: "Is this number decimal less than one? Do the digits in this decimal total 12? Does this number have a five in the hundredths place? Is this number equivalent to $\frac{3}{4}$?"
3. Group or pair students and give *one* student in the group an index card with a secret decimal number.
4. Other students in the group will try to guess the secret number. If the guess is incorrect, the student with the card will tell the others whether the secret number is greater or less than the number guessed. Students will continue to ask "yes" or "no" questions until they correctly guess the secret decimal number.

Variations:

- Use a fraction or decimal as the secret number.

Who Is Larger?

Format: Small groups, partners

SOL Objectives:
5.1 The student will
c) compare the values of two decimals through thousandths, using the symbols >, <, or =

Related SOL: 4.4b, 3.3

Vocabulary: *greater*, *least*, *equal*, *decimal*, *tenth*, *hundredths*, *thousandths*

Materials: Number cards

Time Required: 20 minutes

Directions:
1. This game is played like the card game "War."
2. Deal all of the cards among the players (*see possible card numbers below*). Each player turns one card over, and whoever has the largest number wins the cards. (The game also can be played based on who has the smallest number.)
3. If a tie occurs, each player turns over another card, and the largest card wins *all* of the overturned cards.
4. Continue to play until one player wins all of the cards, or the time limit for the game is reached.

Possible Card Numbers:

7.246	7.43	7.7
6.676	6.67	6.6
5.333	5.33	5.3
4.878	4.87	4.8
3.557	3.56	3.6
2.090	2.09	2.9
1.111	1.11	1.1
9.947	9.94	9.9
8.632	8.63	8.6
0.414	0.41	0.4
10.007	10.07	10.0